

THE GENUS CAREX IN INDIANA

By

FREDERICK J. HERMANN



Printed separately, without change of paging from
DEAM'S FLORA of INDIANA



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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in the University of Michigan.

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525. *CAREX* [Dill.] L. SEDGE*

A genus of nearly 2000 species and the largest genus of vascular plants in Indiana. Few species have any economic value but the ecological role of the genus is of great importance. The species of marshes and muddy borders of lakes which form extensive colonies, and to some extent the less gregarious species, comprise an essential step in the successional stages from open water to the culmination in climax forest or prairie. Much of the fertile soils of our region today would still be barren mudflats were it not for the part played by these sedges in the conversion of the once vast boggy areas into a turf, thus enabling less hydrophytic plants to become established and add further to the fertility of the soil.

For the identification of species in this genus it is nearly always necessary to have a specimen with ripe fruit (perigynia) and as a rule the roots are also essential. In the key closely related species have been grouped for convenience into sections, roughly corresponding in size to most of the genera in other groups. After only a slight acquaintance with the sedges of an area it is generally possible to recognize at sight the group or section to which an unknown species belongs, especially since a few of the sections (*Ovales*, *Bracteosae*, *Laxiflorae*, *Acutae*, and *Lupulinae*) will include the great majority of the individuals found in the field.

The most recent and exhaustive treatment of the species of *Carex* in our area is K. K. Mackenzie's monograph in North American Flora 18: 1-478. 1931-35. In the following account this monograph has been freely used in the preparation of the keys and in giving distribution.

NATURAL KEY TO THE SECTIONS OF INDIANA CARICES

- Stigmas two; achenes lenticular; spikes usually bisexual, the lateral sessile.....
Subgenus *Vignea*.
 Stigmas three; achenes triangular; or if stigmas two and achenes lenticular, the
 lateral spikes peduncled; spikes normally unisexual.....Subgenus *Eu-Carex*.

SUBGENUS VIGNEA

Terminal or all spikes androgynous; perigynia not subterete.

Culms arising singly or few together from long-creeping rootstocks.

Heads elongate, 2-7 cm long; culms not branching; perigynia thin- or wing-margined; not plants of sphagnum bogs.

Perigynia thin- but not wing-margined, ovate-orbicular, thick-plano-convex, 3.4-5 mm long; spikes all androgynous; plants of wet habitats.....1. § INTERMEDIAR, p. 218.

Perigynia narrowly wing-margined, oblong-lanceolate, plano-convex, 4.75-6 mm long; lowest spikes usually pistillate, the middle staminate, and terminal androgynous; plants of dry sandy habitats.....2. § ARENARIAE, p. 218.

Heads ovoid, 0.5-1.2 cm long; culms becoming decumbent and branching; perigynia neither thin- nor wing-margined, oblong-obovate, thick-plano-convex, 2.5-3.75 mm long; plants of sphagnum bogs.....3. § CHORDORRHIZAE, p. 219.

Culms caespitose, the rootstocks sometimes short-prolonged with short internodes but not long-creeping.

Perigynia abruptly contracted into the beak; culms not flaccid and not flattening in drying.

Spikes few (generally 10 or fewer), usually greenish...4. § BRACTEOSAE, p. 219.

* Contributed by Frederick J. Hermann, University of Michigan.

Spikes numerous, yellowish or brownish at maturity; leaf sheaths often red-dotted ventrally.

Perigynia plano-convex, thin, yellowish; bracts mostly much exceeding the spikes; leaf sheaths usually transversely rugulose ventrally.....5. § MULTIFLORAE, p. 224.

Perigynia thick-plano-convex or unequally biconvex, brown; bracts mostly shorter than the spikes; leaf sheaths not transversely rugulose.....6. § PANICULATAE, p. 225.

Perigynia tapering into the beak or, if abruptly contracted, culms flaccid and flattening in drying.....7. § VULPINAЕ, p. 226.

Terminal or all spikes gynaeceandrous or, if androgynous, perigynia subterete and spikes 1-3-flowered.

Perigynia without winged margins, at most thin-edged.

Perigynia 2-4 mm long.

Perigynia not thin-edged, ascending or appressed, elliptic.....8. § HELEONASTES, p. 229.

Perigynia thin-edged, spreading, ovoid, usually broadest below the middle.....9. § STELLULATAE, p. 230.

Perigynia 4-5 mm long, narrowly lanceolate, appressed..10. § DEWEYANAE, p. 232.

Perigynia with winged margins.....11. § OVALES, p. 232.

SUBGENUS EU-CAREX

Style articulated with the achene, at length deciduous; achenes apiculate or blunt at the apex; perigynia closely enveloping the achenes or moderately inflated.

Spikes solitary, androgynous; perigynia beakless, rounded at the apex, glabrous.....12. § POLYTRICHOIDEAE, p. 237.

Spikes one to many, when one the perigynia not as above.

Lower pistillate scales bractlike; achenes rounded at the apex, strongly constricted at the base.....13. § PHYLLOSTACHYAE, p. 238.

Lower pistillate scales not bractlike; achenes apiculate-tipped, not strongly constricted at the base.

Achenes with sides convex above, closely enveloped by the perigynia; bracts sheathless, scalelike or setaceous.....14. § MONTANAE, p. 238.

Achenes with flat or concave sides; bracts from sheathless to long-sheathing.

Achenes closely enveloped by the perigynia; bracts, when present, strongly sheathing.

Perigynia pubescent or puberulent, at least at the base of the beak.

Bracts either reduced to sheaths or absent.

Culms not dioecious; spikes more than one; bracts bladeless.....15. § DIGITATAE, p. 242.

Culms dioecious; spike solitary, bractless.....16. § PICTAE, p. 243.

Bracts with well-developed blades.....17. § TRIQUETRAE, p. 243.

Perigynia glabrous.....18. § ALBAE, p. 243.

Achenes not closely enveloped by the perigynia except at the base.

Bracts long-sheathing (except in *C. prasina* of § *Gracillimae*, a species with sharply triangular perigynia which are long- and flat-beaked, nerveless except for the prominent lateral pair of nerves); achenes triangular (except in § *Bicolores*, species with pulverulent or golden yellow perigynia).

Beak of perigynium entire, emarginate, or obliquely cut and at length bidentate.

Pistillate spikes short, oblong to linear, erect or, if drooping, the perigynia acutely triangular.

Achenes lenticular; stigmas two.....19. § BICOLORS, p. 244.

Achenes triangular; stigmas three.

Perigynia with few to many strongly raised nerves.

Perigynia tapering at the base, triangular; achenes usually closely enveloped.

- Rootstocks elongate, producing long horizontal stolons.....20. § PANICEAE, p. 244.
- Rootstocks not elongate, not producing long horizontal stolons.
.....21. § LAXIFLORAE, p. 246.
- Perigynia rounded at the base, suborbicular in cross section;
achenes loosely enveloped.....22. § GRANULARES, p. 250.
- Perigynia with numerous fine impressed nerves.
Perigynia tapering at the base, constricted at the apex, obtusely
triangular; achenes closely enveloped.....23. § OLIGOCARPAE, p. 251.
- Perigynia rounded at both ends, orbicular or orbicular-triangular
in cross section.....24. § GRISEAE, p. 252.
- Pistillate spikes elongate, linear to cylindric, slender-peduncled, the
lower drooping.
Perigynia beakless or short-beaked; terminal spike gynaeceandrous
(except in *C. prasina*, and rarely in *C. gracillima*).....25. § GRACILLIMAE, p. 253.
- Perigynia conspicuously beaked; terminal spike staminate (rarely
with a few perigynia at the base).
Pistillate spikes narrowly linear, 3-4 mm wide; culms strongly
reddish-tinged at the base, aphyllopodic.....26. § SYLVATICAE, p. 254.
- Pistillate spikes oblong-cylindric, 8-10 mm wide; culms not strongly
reddish-tinged at the base, phyllopodic.....27. § LONGIROSTRES, p. 255.
- Beak of perigynium bidentate.....28. § EXTENSAE, p. 256.
- Bracts sheathless or very short-sheathing (rarely the lowest long-sheathing
in *C. lasiocarpa* of § *Hirtae*).
Perigynia or foliage (especially the sheaths) or both pubescent.
Beak of perigynium at most shallowly bidentate; styles very short,
thickish, leaves not septate-nodulose.....29. § VIRESCENTES, p. 257.
- Beak of perigynium strongly bidentate; styles long, slender; leaves
septate-nodulose.....30. § HIRTAE, p. 258.
- Perigynia and foliage not pubescent.
Achenes triangular; stigmas three.
Perigynia strongly beaked, scabrous.....30a. § ANOMALAE, p. 259.
- Perigynia beakless or short-beaked, not scabrous.
Perigynia transversely corrugated.....31. § SHORTIANAE, p. 259.
- Perigynia not transversely corrugated, papillate.
Terminal spike staminate; roots closely clothed with a yellowish
felt.....32. § LIMOSAE, p. 260.
- Terminal spike gynaeceandrous; roots not clothed with a yellowish
felt.....33. § ATRATAE, p. 260.
- Achenes lenticular; stigmas two.
Achenes not constricted in the middle; pistillate scales obtuse to
acuminate.....34. § ACUTAE, p. 260.
- Achenes constricted in the middle; pistillate scales long-awned.....35. § CRYPTOCARPAE, p. 262.
- Style not articulated, continuous with the achene, persistent, indurated; perigynia mod-
erately to strongly inflated (only slightly so in some species of § *Paludosae* and
§ *Pseudo-Cyper*).
- Perigynia many-nerved, lanceolate, tapering into the beak.
Spikes solitary, androgynous; perigynia widely spreading or reflexed, early de-
ciduous; leaf blades involute, 0.5 mm wide.....35a. § ORTHOCERATE., p. 263.
- Spikes several; perigynia ascending, not early deciduous; leaf blades flat, 5-15 mm
wide.....36. § FOLLICULATAE, p. 263.
- Perigynia strongly ribbed, usually broader, generally abruptly contracted into the
beak.

- Perigynia finely and closely ribbed.....37. § PSEUDO-CYPERI, p. 263.
 Perigynia coarsely ribbed.
 Perigynia subcoriaceous; foliage or perigynia or both sometimes pubescent.
38. § PALUDOSAE, p. 264.
 Perigynia membranaceous; foliage and perigynia not pubescent (except perigynia sometimes hispidulous in *C. Grayii* of § *Lupulinae*).
 Perigynia obconic or broadly obovoid, truncately contracted into a long subulate beak.....39. § SQUARROSAE, p. 266.
 Perigynia from lanceolate to ovoid or globose-ovoid, not truncately contracted.
 Perigynia 7-10 mm long; achenes 2-3 mm long, 1.25-2.5 mm wide.....
40. § VESICARIAE, p. 267.
 Perigynia 10-20 mm long; achenes 2.5-6 mm long; 2-4 mm wide.....
41. § LUPULINAE, p. 269.

ARTIFICIAL KEY TO THE SECTIONS OF INDIANA CARICES

Spike one.

- Perigynia strongly inflated, sessile or nearly so, not becoming reflexed; pistillate scales persistent.....39. § SQUARROSAE, p. 266.
 Perigynia not inflated.
 Pistillate scales not foliaceous; perigynia not abruptly beaked.
 Pistillate scales deciduous; perigynia stipitate, at least the lower reflexed at maturity.....35a. § ORTHOCERATES, p. 263.
 Pistillate scales persistent; perigynia not reflexed.
 Perigynia rounded at the apex; spike androgynous.....
12. § POLYTRICHOIDEAE, p. 237.
 Perigynia abruptly tapering to a pointed, slightly bidenticulate apex; spike entirely staminate or pistillate.....16. § PICTAE, p. 243.
 Lower pistillate scales foliaceous; perigynia abruptly beaked.....
13. § PHYLLOSTACHYAE, p. 238.

Spikes more than one.

Stigmas two; achenes lenticular.

- Lateral spikes sessile, short; terminal spike usually androgynous or gynaeceandrous. (*Vigneae*).
 Culms arising singly or few together from long-creeping rootstocks; perigynia not subterete.
 Heads elongate, 2-7 cm long; culms not branching; perigynia thin- or wing-margined; not plants of sphagnum bogs.
 Perigynia thin- but not wing-margined, ovate orbicular, thick-plano-convex, 3-4.5 mm long; spikes all androgynous; plants of wet habitats.....
1. § INTERMEDIATEAE, p. 218.
 Perigynia narrowly wing-margined, oblong-lanceolate, plano-convex, 4.75-6 mm long; lowest spikes usually pistillate, the middle staminate, and terminal androgynous; plants of dry sandy habitats.....
2. § ARENARIAE, p. 218.
 Heads ovoid, 0.5-1.2 cm long; culms becoming decumbent and branching; perigynia neither thin- nor wing-margined, oblong-obovate, thick-plano-convex, 2.5-3.75 mm long; plants of sphagnum bogs.....
3. § CHORDORRHIZAE, p. 219.
 Culms caespitose, the rootstocks occasionally somewhat prolonged with short internodes but not long-creeping (except occasionally in *C. disperma* of § *Heleonastes* which has subterete perigynia).
 Spikes androgynous, many-flowered; perigynia not subterete.
 Perigynia abruptly contracted into the beak; culms not flaccid and not flattening in drying.
 Spikes few (generally 10 or fewer), usually greenish.....
4. § BRACTEOSAE, p. 219.

- Spikes numerous, yellowish or brownish at maturity; leaf sheaths often red-dotted ventrally.
- Perigynia plano-convex, thin, yellowish; bracts mostly much exceeding the spikes; leaf sheaths usually transversely rugulose ventrally.5. § MULTIFLORAE, p. 224.
- Perigynia thick-plano-convex or unequally biconvex, brown; bracts mostly shorter than the spikes; leaf sheaths not transversely rugulose.6. § PANICULATAE, p. 225.
- Perigynia tapering into the beak or, if abruptly contracted, culms flaccid and flattening in drying.7. § VULPINAЕ, p. 226.
- Spikes not androgynous or, if so, perigynia subterete and spikes only 1-3-flowered.
- Perigynia without winged margins, at most thin-edged.
- Perigynia 2-4 mm long.
- Perigynia not thin-edged, ascending or appressed, elliptic.8. § HELEONASTES, p. 229.
- Perigynia thin-edged, spreading, ovoid, usually broadest below the middle.9. § STELLULATAE, p. 230.
- Perigynia 4-5 mm long, narrowly lanceolate, appressed.10. § DEWEYANAE, p. 232.
- Perigynia with winged margins.11. § OVALES, p. 232.
- Lateral spikes peduncled or, if sessile, elongate; terminal spike usually staminate. (*Eu-Carex*.)
- Style articulated with the achene, at length deciduous; perigynia not lustrous.
- Lowest bract long-sheathing; perigynia pulverulent or golden yellow at maturity.19. § BICOLORES, p. 244.
- Lowest bract sheathless or rarely short-sheathing, perigynia not pulverulent or golden yellow.
- Achenes not constricted in the middle; scales not long-awned, 1-nerved.34. § ACUTAE, p. 260.
- Achenes constricted in the middle; scales long-awned, 3-nerved.35. § CRYPTOCARPAE, p. 262.
- Style continuous with the achene, persistent, indurated; perigynia lustrous.40. § VESICARIAE, p. 267.
- Stigmas three; achenes triangular.
- Perigynia pubescent or scabrous.
- Style articulated with the achene, at length deciduous.
- Achenes closely enveloped by the perigynia; bracts sheathless or nearly so.
- Perigynia obtusely triangular or orbicular-triangular in cross section; plant (except perigynia) glabrous.14. § MONTANAE, p. 238.
- Perigynia sharply triangular; plant pubescent.17. § TRIQUETRAE, p. 243.
- Achenes not closely enveloped by the perigynia or, if so, the bracts strongly sheathing.
- Bracts sheathing, their blades absent or rudimentary; achenes closely enveloped by the perigynia.15. § DIGITATAE, p. 242.
- Bracts with well-developed blades.
- Bracts sheathless or the lower short-sheathing.
- Perigynia pubescent.
- Beak of perigynium at most shallowly bidentate; styles very short, thickish; leaves not septate-nodulose.29. § VIRESCENTES, p. 257.
- Beak of perigynium strongly bidentate; styles long, slender; leaves septate-nodulose.30. § HIRTAE, p. 258.
- Perigynia scabrous.30a. § ANOMALAE, p. 259.
- Bracts, at least the lower ones, long-sheathing.
- Beak of perigynium not strongly bidentate.21. § LAXIFLORAE, p. 246.
- Beak of perigynium strongly bidentate.30. § HIRTAE, p. 258.
- Style not articulated, continuous with the achene, persistent, indurated.
- Perigynia less than 1 cm long; spikes cylindric.38. § PALUDOSAE, p. 264.

Perigynia 1 cm long or longer; spikes globose.....
*C. Grayii* in 41. § LUPULINAE, p. 269.

Perigynia glabrous.

Style articulated with the achene, at length deciduous.

Achenes strongly constricted at the base, rounded at the apex; lower pistillate scales bractlike.....13. § PHYLLOSTACHYAE, p. 238.

Achenes not strongly constricted at the base, apiculate at the apex; lower pistillate scales not bractlike.

Bracts long-sheathing, at least the lower ones.

Bracts bladeless or with rudimentary blades.

Leaf blades filiform.....18. § ALBAE, p. 243.

Leaf blades not filiform.....21. § LAXIFLORAE, p. 246.

Bracts with well-developed blades.

Foliage, especially the sheaths, pubescent or puberulent.

Perigynia beakless or short-beaked; terminal spike gynaeandrous (rarely staminate in *C. gracillima*)...25. § GRACILLIMAE, p. 253.

Perigynia conspicuously beaked; terminal spike staminate.....
26. § SYLVATICAE, p. 254.

Foliage glabrous.

Beak of perigynium not bidentate, at most emarginate.

Pistillate spikes short, oblong to linear, erect or, if drooping, either on long capillary peduncles or the perigynia acutely triangular.

Perigynia with few to many strongly raised nerves.

Perigynia tapering at the base, triangular, closely enveloping the achenes.

Rootstocks elongate, often producing long horizontal stolons.
20. § PANICEAE, p. 244.

Rootstocks not elongate, not producing long horizontal stolons.....21. § LAXIFLORAE, p. 246.

Perigynia rounded at the base, suborbicular in cross section, loosely enveloping the achenes..22. § GRANULARES, p. 250.

Perigynia with numerous fine impressed nerves.

Perigynia tapering at the base, constricted at the apex, obtusely triangular, closely enveloping the achenes.....

.....23. § OLIGOCARPAE, p. 251.

Perigynia rounded at both ends, orbicular to orbicular-triangular in cross section.....24. § GRISEAE, p. 252.

Pistillate spikes elongate, linear to cylindric, on slender peduncles, the lower usually drooping; perigynia not acutely triangular.

Perigynia beakless or short-beaked; terminal spike gynaeandrous.....25. § GRACILLIMAE, p. 253.

Perigynia conspicuously beaked; terminal spike staminate.

Pistillate spikes narrowly linear, 3-4 mm wide; culms strongly reddish-tinged at the base, aphyllopodic.....

.....26. § SYLVATICAE, p. 254.

Pistillate spikes oblong-cylindric, 8-10 mm wide; culms not strongly reddish-tinged at the base, phyllopodic.....

.....27. § LONGIROSTRES, p. 255.

Beak of perigynium bidentate.

Pistillate spikes oblong-cylindric, on slender drooping peduncles; perigynia obliquely cut, at length bidentate.....

.....27. § LONGIROSTRES, p. 255.

Pistillate spikes suborbicular to short-oblong, on short erect or ascending peduncles or sessile, perigynia equally bidentate.

.....28. § EXTENSAR, p. 256.

Bracts (lower) sheathless or very short-sheathing.

Terminal spike staminate (in *C. prasina* occasionally bearing a few

- perigynia); perigynia appressed or ascending; leaf sheaths not septate-nodulose.
- Perigynia rounded and minutely beaked at the apex; pistillate spikes oblong, 1-2.5 cm long.....32. § LIMOSAE, p. 260.
- Perigynia tapering into a beak nearly the length of the body; pistillate spikes linear, 2-6 cm long. *C. prasina* in 25. § GRACILLIMAE, p. 253.
- Terminal spike gynaeceandrous.
- Perigynia transversely corrugated.....31. § SHORTIANAE, p. 259.
- Perigynia not transversely corrugated.....33. § ATRATAE, p. 260.
- Style persistent, indurated, continuous with the achene.
- Perigynia subcoriaceous and firm.....38. § PALUDOSAE, p. 264.
- Perigynia membranaceous.
- Perigynia obconic or broadly obovoid, truncately contracted into the long, subulate beaks.....39. § SQUARROSAE, p. 266.
- Perigynia from lanceolate to ovoid or globose-ovoid, not truncately contracted.
- Perigynia lanceolate or ovoid-lanceolate, tapering into the beak.
- Perigynia many-nerved, slightly inflated, 3 mm wide or less, yellowish green; achenes 3.5 mm long.....36. § FOLLICULATAE, p. 263.
- Perigynia strongly ribbed, strongly inflated, ovoid-lanceolate, 3.5 mm wide or more, green; achenes 5 mm long..41. § LUPULINAE, p. 269.
- Perigynia broader, abruptly contracted into the beak, usually strongly ribbed.
- Perigynia finely and closely ribbed.....37. § PSEUDO-CYPERI, p. 263.
- Perigynia coarsely ribbed.
- Perigynia 7-10 mm long; achenes 2-3 mm long, 1.25-2.25 mm wide.40. § VESICARIAE, p. 267.
- Perigynia 10-20 mm long; achenes 2.5-6 mm long, 2-4 mm wide.41. § LUPULINAE, p. 269.

1. § INTERMÈDIAE

- Perigynia ovate-orbicular, 2.5-3 mm long, 1.5-1.75 mm wide, abruptly contracted into a beak about a fourth the length of the body.....1. *C. Sartwellii*.
- Perigynia elliptic, 4-4.5 mm long, 1-1.3 mm wide, very gradually long-beaked.....1a. *C. Sartwellii* var. *stenorrhyncha*.

1. *Carex Sartwellii* Dewey. Map 418. Occasional in marshes and marly sloughs, more rarely in sandy ditches, in the northern half of the state; becoming frequent in the dune area.

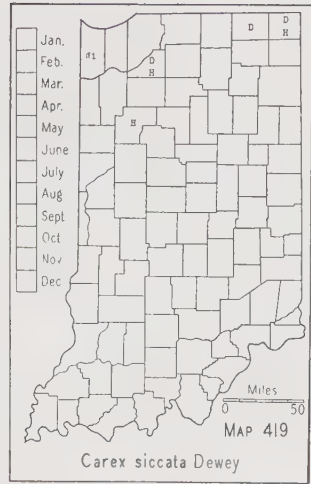
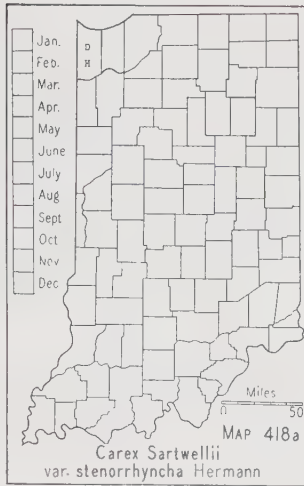
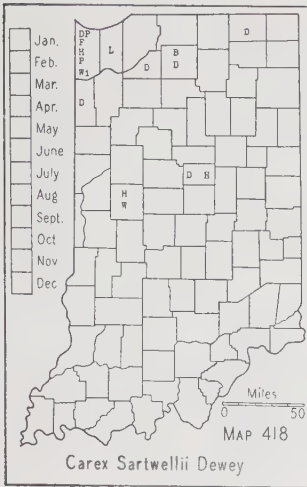
Ont. and w. N. Y. to B. C., southw. to Ill., Mo., Nebr., and Colo.

1a. *Carex Sartwellii* var. *stenorrhyncha* Hermann. (*Rhodora* 40: 78. 1938.) Map 418a. Known only from two localities, both in Lake County: in a prairie marsh south of Sheffield St. and west of Calumet Ave., two miles north of Hammond, Deam no. 53920 (Deam Herbarium); and on a prairie east of Wolf Lake, Hermann no. 6052 (Type in Gray Herbarium).

2. § ARENÀRIAE

2. *Carex siccata* Dewey. (*Carex foenea* Willd., according to Svenson in *Rhodora* 40: 325-329. 1938.) Map 419. Infrequent in the lake area in dry open sandy soil and in open black oak woods.

Maine to Wash. and Mack., southw. to N. J., Ind, Nebr., and in the mts. to Ariz.



3. § CHORDORRHIZAE

3. *Carex chordorrhiza* L. f. Map 420. A northern species reaching the southern limit of its range in northern Indiana where it is rare. The two Indiana collections are from very wet sphagnum bogs; elsewhere in its range it is found also on peaty borders of lakes. The Indiana stations are: in a tamarack bog a mile south of Leesburg, Kosciusko County, and in an open tamarack bog west of Goose Lake, Whitley County.

Lab. and Newf. to Keewatin, southw. to N. Y., Ind., Iowa, and Sask.; also in n. Eurasia.

4. § BRACTEÏSAE

Sheaths tight, inconspicuously or not at all mottled with green and white or septate-nodulose dorsally (except sometimes in *C. Leavenworthii*); leaf blades 1-4.5 mm wide.

Perigynia distended and spongy at the base, usually widely spreading or reflexed at maturity.

Beaks of perigynia smooth, scarcely exceeding the acuminate, deciduous scales.

.....4. *C. retroflexa*.

Beaks of perigynia minutely serrulate, much exceeding the obtuse or somewhat acute, persistent scales.

Stigmas long, slender, usually not twisted, light reddish; perigynium tapering into the beak; leaf blades 1-2 mm wide.....5. *C. rosea*.

Stigmas short, stout, strongly twisted or contorted, deep red; perigynium abruptly contracted into the beak.

Leaf blades 1.5-3 (averaging 2.5) mm wide; spikes with 6-20 perigynia; perigynia 3.25-4.5 mm long.....6. *C. convoluta*.

Leaf blades 1-1.75 (averaging 1) mm wide; spikes with 2-6 perigynia; perigynia 2.25-3 mm long. (See excluded species no. 1, p. 271)....*C. radiata*.

Perigynia not distended and spongy at the base, mostly ascending.

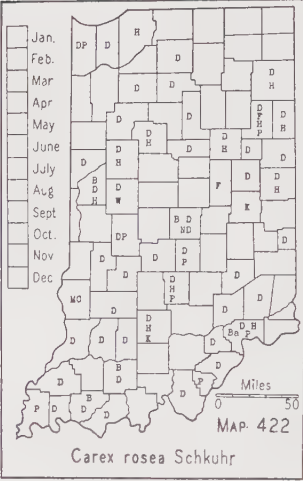
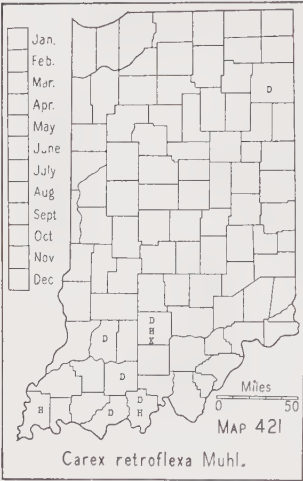
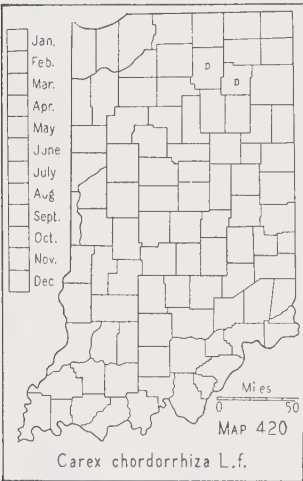
Inflorescence ovoid or oblong-ovoid; spikes densely capitate.

Scales much shorter than the bodies of the perigynia.

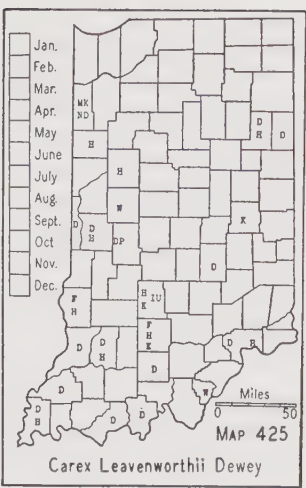
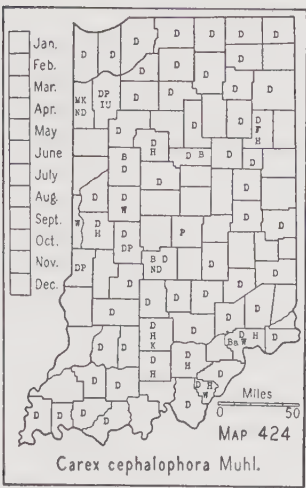
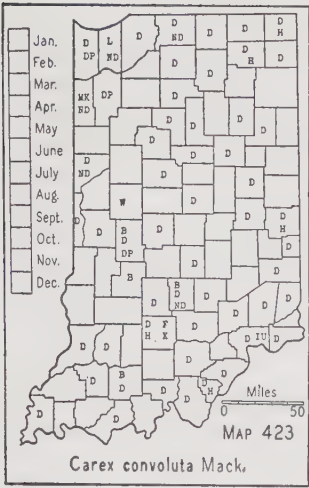
Perigynia broadest below the middle, round-tapering at the base, with raised margins ventrally; beaks long, serrulate.....7. *C. cephalophora*.

Perigynia broadest at the truncate-cordate base, flat ventrally; beaks short, smooth.....8. *C. Leavenworthii*.

Scales from little shorter to longer than the bodies of the perigynia.



- Culms lax; perigynia faintly nerved dorsally; stigmas short...9. *C. mesochorea*.
Culms stiff, erect; perigynia generally strongly nerved to ribbed dorsally;
stigmas long, slender.....10a. *C. Muhlenbergii* var. *enervis*.
Inflorescence oblong or linear-oblong to elongate and interrupted; spikes not
capitate.
Perigynia strongly nerved and low-convex ventrally, the margins usually slightly
raised.....10. *C. Muhlenbergii*.
Perigynia nerveless or nerved only at the base ventrally, the margins not raised
at maturity.
Perigynia sessile, short-beaked, spreading, 3-3.5 mm long; bracts not broadly
dilated at the base; scales about the length of and narrower than the
bodies of the perigynia, cuspidate or short-aristate.....
.....10a. *C. Muhlenbergii* var. *enervis*.
Perigynia stipitate, long-beaked, ascending, 3.5-5 mm long; bracts broadly
dilated at the base; at least the lower scales exceeding and as wide as
the perigynia, long-awned. (See excluded species no. 2, p. 272).....
.....*C. australis*.
Sheaths loose, mottled with green and white and usually septate-nodulose dorsally; leaf
blades 4.5-8 (in *C. aggregata* rarely only 3) mm wide.
Perigynia not deep green at maturity, with border raised ventrally only above the
middle, the beak a fourth to a third the length of the ovate or suborbicular
body or, if longer, the ventral suture deep; spikes approximate in a cylindric
or ovoid head.
Perigynia ovate, tapering into the beak, typically smooth or faintly nerved
dorsally, beak very sharply bidentate, the teeth about 1 mm long; pistillate
scales mostly strongly awned; leaf blades rarely over 5 mm wide.....
.....11. *C. grvida*.
Perigynia broadly ovate to suborbicular, abruptly beaked, typically strongly ribbed
dorsally; beak less sharply bidentate, the teeth about 0.5 mm long; pistillate
scales mostly acuminate to short-awned; leaf blades often 6-8 mm wide....
.....11a. *C. grvida* var. *Lunelliana*.
Perigynia deep green, the beak a third the length of the ovate body or more or, if
rarely shorter, the ventral suture shallow.
Mature perigynia membranaceous, flat ventrally; leaf blades 3-7 mm wide; spikes
approximate or the lower separate.
Scales acute or somewhat obtuse, half the length of the bodies of the perigynia;
stigmas short; sheaths truncate at the mouth, the lower transversely
rugulose; perigynia narrowly ovate or even elliptic with a narrow, gradually
contracted beak; culms often slightly winged.....12. *C. cephaloidea*.



Scales acuminate or short cuspidate (rarely merely acute), about the length of the bodies of the perigynia; stigmas long and slender; sheaths concave at the mouth, usually not at all transversely rugulose; culms sulcate and white-striate up to the inflorescence, their angles usually smooth.....
.....13. *C. aggregata*.

Mature perigynia subcoriaceous, ovate, with border raised ventrally to the base, abruptly contracted into a short, stout beak, culms sulcate and white-striate only below, minutely winged or thin-margined up to the inflorescence, serrulate on the angles; leaf blades 5-10 mm wide; lower sheaths usually transversely rugulose; lower spikes usually separate; stigmas short and stout; scales short, blunt to acute.....14. *C. sparganioides*.

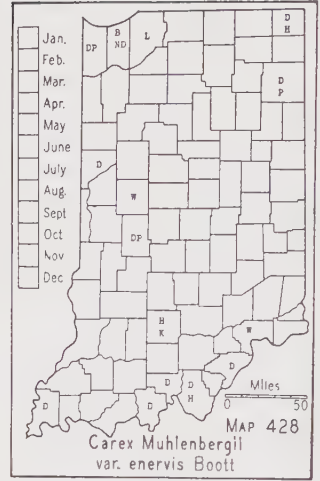
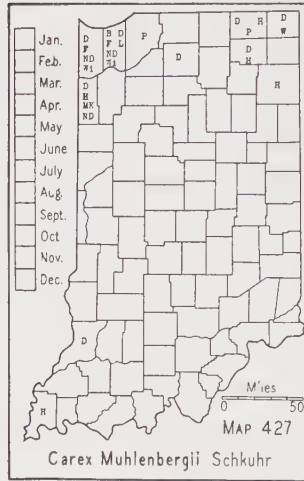
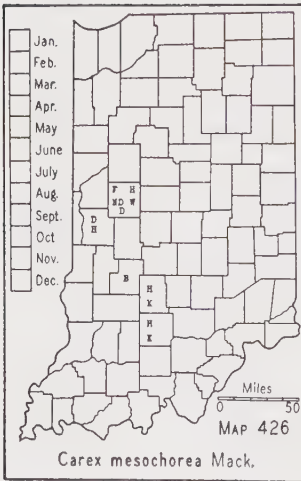
4. **Carex retrofléxa** Muhl. Map 421. Very local in northern Indiana; frequent in the unglaciated area of the southwestern counties. A woodland species partial to dry rocky white oak woods, especially in sandstone areas. Vt. to Mich., southw. to Fla. and Tex.

5. **Carex ròsea** Schkuhr. Map 422. Very common in both dry and moist woods. This species and *C. convoluta* are perhaps the most plentiful woodland sedges in the state as a whole. N. S. to N. Dak., southw. to Ga. and La.

6. **Carex convolùta** Mack. (Bull. Torrey Bot. Club 43: 428. 1916.) (*Carex rosea* of authors.) Map 423. Very common in dry and low woods of all types. Often in somewhat richer soils than *C. rosea*. N. S. to Man., southw. to Ala., Tenn., and Ark.

7. **Carex cephalóphora** Muhl. Map 424. Very common in oak and beech-maple woods; occasional along open grassy roadsides and in thickets. Maine to Man., southw. to Fla. and Tex.

8. **Carex Leavenwóρθii** Dewey. Map 425. Frequent, except in the lake area, in open grassy, generally dry or sandy, oak woods and bordering thickets; occasionally bordering woods in clay fallow fields. Southern N. J., sw. Ont. and Iowa to Fla. and Tex.



9. *Carex mesochorea* Mack. (Bull. Torrey Bot. Club 37: 246. 1910.) (*Carex mediterranea* Mack.) Map 426. Rare or local in pasture fields and on open, wooded, grassy slopes. At the Montgomery County station, on an open white oak ridge 5 miles west of New Market, it is associated with *Poa pratensis*, *Danthonia spicata*, *Luzula echinata* var. *mesochorea*, *Antennaria neglecta* and "reindeer moss."

Southern Mass. and N. Y., to D. C., Tenn., and Ind.

10. *Carex Muhlenbergii* Schkuhr. Map 427. Frequent to common in the lake area in dry sandy fallow fields and open oak woods and on dunes; occasional in southern Indiana.

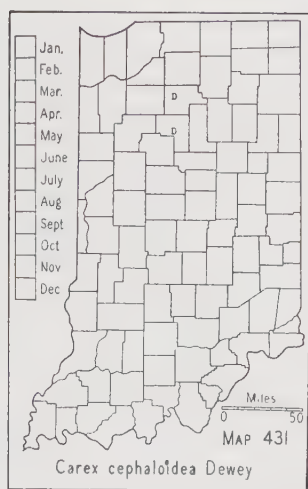
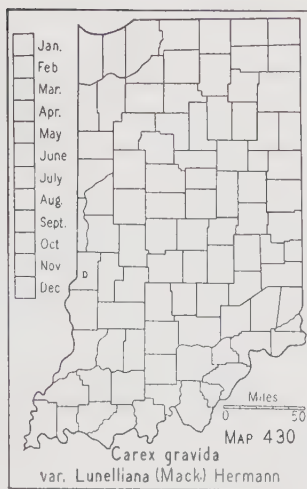
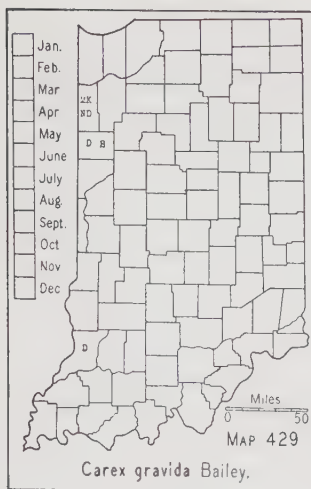
Maine to Minn., southw. to Fla. and Tex.

10a. *Carex Muhlenbergii* var. *enervis* Boott. (*Carex plana* Mack. Bull. Torrey Bot. Club 50: 350. 1923.) Map 428. Frequent on slopes, in sandy open woods, on wooded dunes, and in dry sandy fields. It is partial to somewhat less open habitats than the species and is less often on low or level ground, its favorite habitat being on or near the crests of wooded dunes, river bluffs, and oak ridges.

Specimens intermediate between *C. Muhlenbergii* and var. *enervis* in some or most of their characters seem to be too frequent to warrant the treatment of the latter as a species. The ventrally flat perigynium is a conspicuous character of typical var. *enervis* when fully mature or over-ripe but it is very inconstant and specimens with a pronounced raised border up to maturity are especially frequent.

Maine to Nebr., southw. to Ala. and Tex.

11. *Carex grávida* Bailey. (Including *Carex gravida* var. *laxifolia* Bailey.) Map 429. Known in Indiana only from the prairie area in the westernmost tier of counties where it is found on sandy bur oak ridges and sandy and gravelly railroad embankments.



Reported from Lake County by Peattie and by Pepoon but no authentic specimens could be found. The Lake County reports were probably based upon specimens of *C. Muhlenbergii* in the Field Museum and University of Wisconsin herbaria which were collected by Umbach and distributed as *C. gravida*. The report from Fayette County by Deam was based upon a specimen of *C. aggregata* which was referred to *C. gravida* by Mackenzie.

Deam no. 43219 is intermediate between *C. gravida* and its var. *Lunelliana*.

Sw. Ont. and Ohio to N. Dak. and Wyo., southw. to Mo. and Kans.

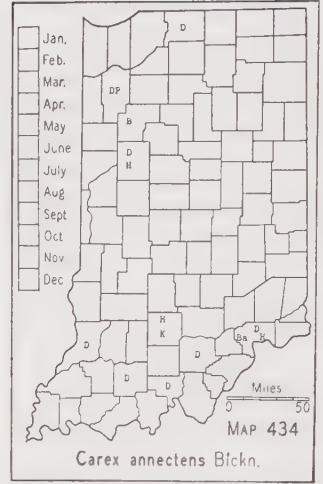
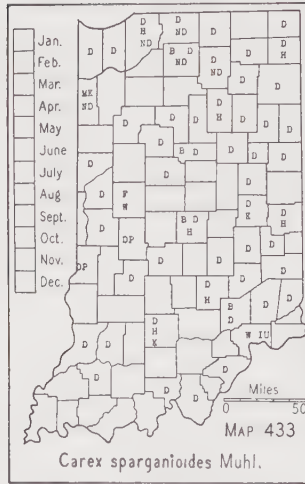
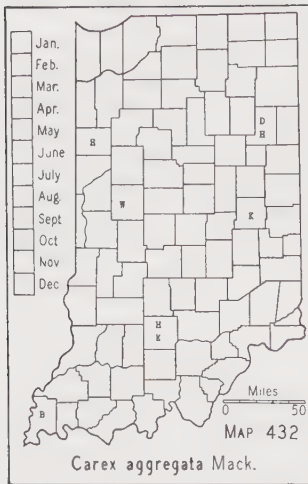
11a. *Carex gravida* var. *Lunelliana* (Mack.) Hermann. (Amer. Midland Nat. 17: 855. 1936.) (*Carex Lunelliana* Mack. Bull. Torrey Bot. Club 42: 615. 1915.) Map 430. On sandy roadsides and railroad embankments in the westernmost tier of counties where it is rare. Some of the Benton County specimens intergrade slightly with the species but the Vigo County plants from very sandy soil on a roadside knoll 5 miles north of Terre Haute are a good match with the type material of *C. Lunelliana*.

Ind. and Iowa to Tex. and N. Mex.

12. *Carex cephaloidea* Dewey. Map 431. Rich woods. In Indiana known only from two collections by Deam: beech-sugar maple woods a mile and a half west of New Waverly, Cass County; and low woods bordering Tippecanoe River north of DeLong, Fulton County. It is probably more frequent than the few collections would indicate since it resembles the ubiquitous *C. sparganioides* so closely that it is apt to be passed by as that species.

The Tippecanoe County report by Smith is not supported by a specimen nor could any specimen be found to confirm Peattie's report from Lake County.

Specimens of *C. alopecoidea* (§ *Vulpinae*) before fully mature, and particularly when from an open habitat, often closely simulate *C. cephaloidea*. These may be most readily distinguished by their acuminate to cuspidate or aristate pistillate scales which are more than half the length



of the bodies of the perigynia and have a conspicuous green center. In *C. cephaloidea* the pistillate scales are obtuse or at most acute, half the length of the bodies of the perigynia or shorter, and are hyaline throughout (never becoming coppery-tinged at maturity as in *C. alopecoidea*) except for the faint green midrib.

N. B. to Minn., southw. to N. J. and Ill.

13. *Carex aggregata* Mack. (Bull. Torrey Bot. Club 37: 246. 1910.) Map 432. Infrequent on banks of creeks, on dry grassy and partially wooded slopes, in low open woods, and as a weed in lawns. The perigynia are very susceptible to infection by a smut which often prevents their maturing.

N. J. to D. C., westw. to Kans. and Okla.

14. *Carex sparganioides* Muhl. Map 433. Very common in dry woods (usually sugar maple, beech or white oak), thickets, and along roadsides. One of the most abundant sedges in the state.

Que. to S. Dak., southw. to Va., Ky., and Kans.

5. § MULTIFLORAE

Beak of perigynium much shorter than the body; perigynium subcoriaceous; leaves usually shorter than the culms.

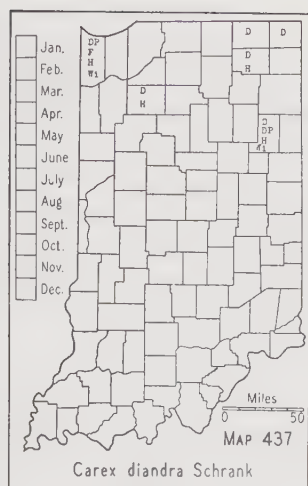
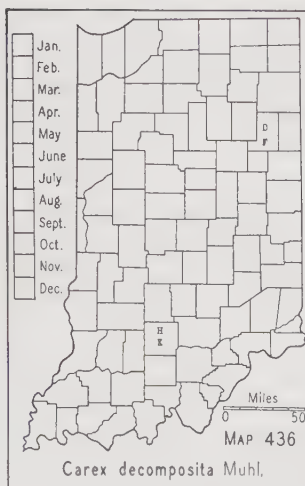
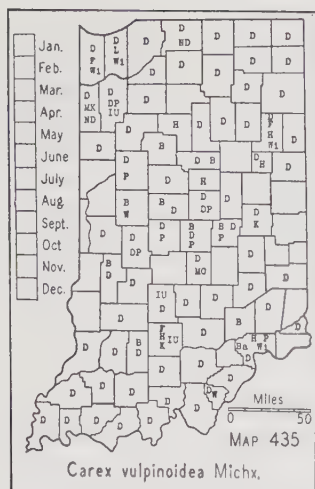
Perigynia mostly broadest at the base, usually nerved dorsally, 2 mm or more wide; beak of perigynium prominent, conspicuously cleft.....15. *C. annectens*.

Perigynia mostly broadest at or below the middle, nerveless dorsally, usually less than 2 mm wide; beak of perigynium very small, obscurely cleft; heads generally shorter and denser.....15a. *C. annectens* var. *xanthocarpa*.

Beak of perigynium about equaling the body; perigynium membranaceous; leaves normally exceeding the culms.

Perigynia ovate, the body corky-margined to the base, contracted into the beak.....16. *C. vulpinoidea*.

Perigynia narrowly lanceolate, the body thin-edged and not at all corky-margined, tapering gradually into the beak; teeth of perigynium almost obsolete; plant low, densely cespitose; leaves narrow, rigid; inflorescence short, broad, and congested. (See excluded species no. 3, p. 272)....*C. vulpinoidea* var. *pycnocephala*.



15. *Carex annéctens* Bickn. (Bull. Torrey Bot. Club 35: 492. 1908.) (*C. setacea* Dewey var. *ambigua* (Barratt) Fern.) Map 434. Fairly common in the southern counties; infrequent in northern Indiana. In southern Indiana it occurs most commonly in low flat woods although it is frequently found in wet fallow clay fields; in the northern counties it is usually in marshes or pastures.

Maine to Wis., southw. to Tex. and Fla.

15a. *Carex annectens* var. *xanthocárpa* (Bickn.) Wieg. (Bull. Torrey Bot. Club 23: 22. 1896; Rhodora 24: 74. 1922.) (*Carex xanthocarpa* Bickn. and *Carex brachyglossa* Mack.) Known in Indiana from a single collection: Deam no. 42927, in a low place in an open post oak flat south of Half Moon Pond, 10 miles southwest of Mt. Vernon, Posey County.

The report from Knox County by Deam was based upon a collection determined by Mackenzie as *C. brachyglossa* but the specimen should be referred to *C. annectens*.

Maine to Iowa, southw. to Va. and Kans.

16. *Carex vulpinoidea* Michx. Map 435. One of the commonest sedges of swampy places throughout the state. Its favorite habitat is in roadside ditches but it is found also in marshes, swamps, low open woods, and ravines, on flood plains, and banks of streams and ponds.

Newf. to B. C., southw. to Fla., Tex., Ariz., and Oreg.

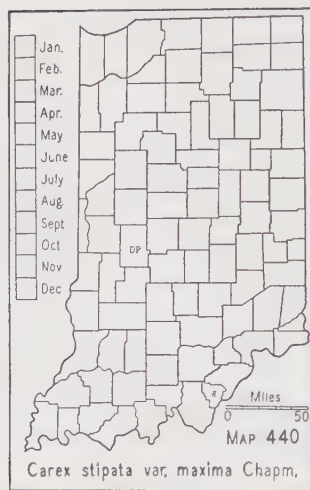
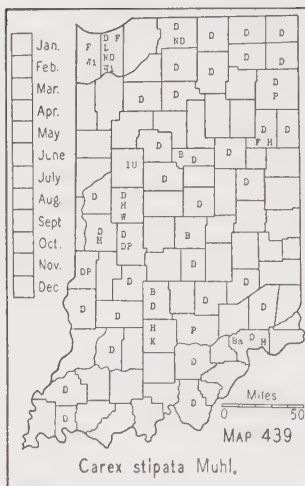
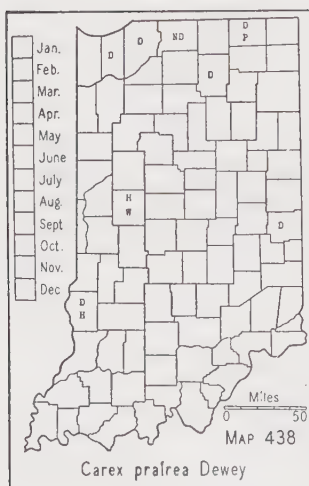
6. § PANICULÀTAE

Leaf blades 3-8 mm wide; perigynia very abruptly short-beaked, tapering at the base; inflorescence usually 8-15 cm long, obviously branched.....17. *C. decomposita*.

Leaf blades 1-3 mm wide; perigynia tapering or contracted into the beak, rounded or truncate at the base; inflorescence 2.5-5 (8) cm long, obscurely branched.

Sheaths not copper-colored at the mouth; head little interrupted; perigynia 2-2.5 mm long, convex ventrally, lustrous, not concealed by the scales...18. *C. diandra*.

Sheaths copper-colored at the mouth; head interrupted; perigynia 2.5-3.5 mm long, flat or concave ventrally, dull, nearly concealed by the scales...19. *C. prairea*.



17. *Carex decomposita* Muhl. Map 436. Specimens to confirm the Marshall and Lake County reports for this very local species could not be located. From Pepon's statement that it is an abundant species in the Chicago region it seems very likely that his report was based upon material of *C. diandra* or perhaps of *C. vulpinoidea*. Specimens of *C. vulpinoidea* collected by Umbach from the Illinois portion of the Chicago region and labeled *C. decomposita* were found in the University of Wisconsin Herbarium. *C. decomposita* is represented from Indiana by two collections: Deam, June 26, 1898, in bunches of moss on logs in a drained pond, Little's woods, Lancaster Twp., six miles northeast of Bluffton, Wells County; and Kriebel no. 2221, in a knothole at base of tree in swamp, two and a half miles northeast of Avoca, Lawrence County.

N. Y. to Mich., southw. to Fla., La., and Mo.

18. *Carex diandra* Schrank. (*Carex teretiuscula* Gooden.) Map 437. Frequent in the lake area on marly and sandy borders of lakes and in swales, marshes, or bogs. The specimen upon which Coulter's report from Daviess County was based should probably be referred to *C. prairea*. The specimen could not be located in the Indiana herbaria.

Newf. to Alaska, southw. to N. J., Ind., and Colo.; also in Eurasia.

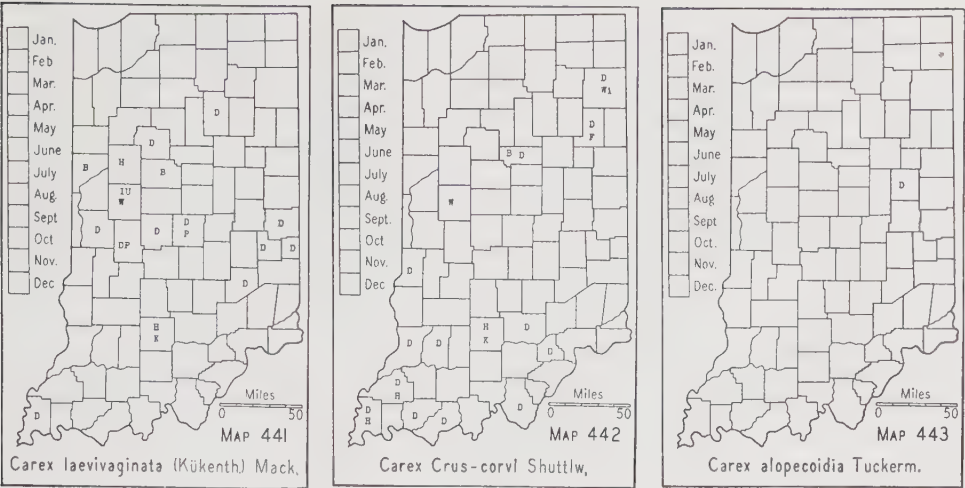
19. *Carex prairea* Dewey. (*Carex teretiuscula* var. *ramosa* Boott and *Carex diandra* var. *ramosa* (Boott) Fern.) Map 438. Frequent, except in southernmost counties, in marshes, tamarack bogs, marly swamps and on borders of streams or lakes.

Que. to Sask., southw. to N. J., Ind., Iowa, and Nebr.

7. § VULPINAE

Perigynium tapering into the beak, the body strongly nerved ventrally or perigynium very long beaked.

Perigynium 4-6 mm long, rounded at the base, strongly nerved ventrally, the beak 1-2 times the length of the body; sheaths not dotted with purple ventrally.



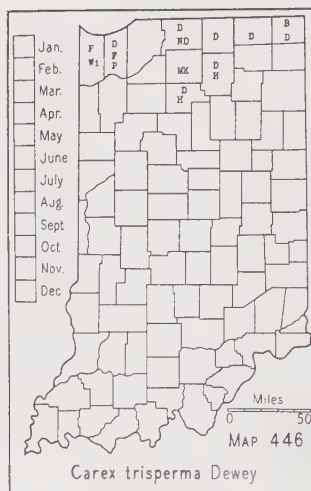
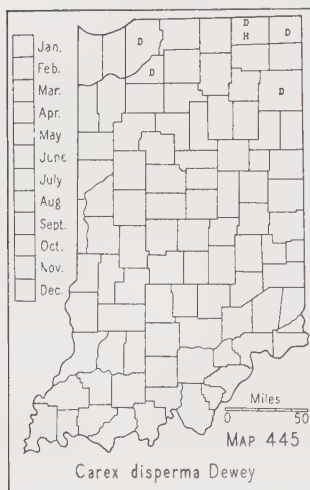
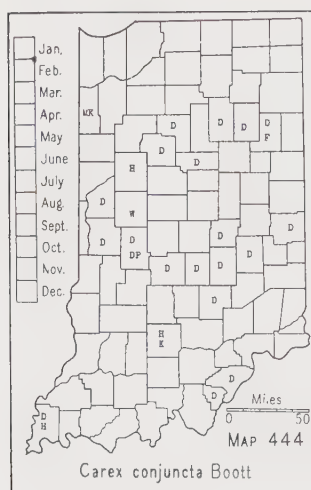
- Sheaths not thickened at the mouth, cross-rugulose ventrally, easily broken, prolonged upward at the mouth.
- Perigynium 4-5 mm long, the beak about the length of the body; leaf blades 4-8 mm wide20. *C. stipata*.
- Perigynium 5-6 mm long, the beak longer than the body; leaf blades 8-15 mm wide20a. *C. stipata* var. *maxima*.
- Sheaths thickened (often cartilaginous) at the mouth, rarely cross-rugulose ventrally, not easily broken, concave or truncate at the mouth.....
-21. *C. laevivaginata*.
- Perigynium 6-7 mm long, abruptly enlarged below into a disklike base, obscurely nerved ventrally except at the base, the beak 2-3 times the length of the body; sheaths dotted with purple ventrally.....22. *C. Crus-corvi*.
- Perigynium contracted into a beak not longer than the body, the body nerveless ventrally except sometimes at the base.
- Sheaths not cross-rugulose ventrally; spikes yellowish or tawny at maturity; perigynium narrow, faintly nerved dorsally, the beak about the length of the body.23. *C. alopecoidea*.
- Sheaths cross-rugulose ventrally; spikes green; perigynium broad, usually strongly nerved dorsally, the beak generally about half the length of the body.....
-24. *C. conjuncta*.

20. *Carex stipata* Muhl. Map 439. Very common in wet habitats throughout Indiana. It is usually found on borders of ponds and streams and in low woods, roadside ditches, swamps, marshes, bogs, and woodland swales.

Newf. to Alaska, southw. to N. C., Tenn., Kans., N. Mex., and Calif.

20a. *Carex stipata* var. *máxima* Chapm. (*Carex stipata* var. *uberior* Mohr and *Carex uberior* (Mohr) Mack.) Map 440. Rare; it is usually found on the borders of ponds and streams, in low woods, roadside ditches, swamps, marshes, bogs, and woodland swales.

In the western portion of its range transitional forms between this plant and *C. stipata* occur with a frequency which discourages attempts to maintain it as specifically distinct. Of the five collections known from Indiana three are typical of var. *maxima* in all their characters while two (Deam no. 36082, with leaves averaging only 7 mm wide, and Deam no. 38688,



with no perigynia over 5 mm long and some less, with the beaks of the perigynia only slightly longer than the bodies but leaves averaging 10 mm wide) approach the typical form of *C. stipata*.

N. J. and Pa. southw. along the coast to Fla. and Tex., and northw. in the Mississippi Valley to Mo. and Ind.

21. *Carex laevivaginata* (Kükenth.) Mack. (Britton and Brown, Illus. Flora, ed. 2, 1: 371. 1913. See also Fernald, Rhodora 17: 231. 1915.) Map 441. Infrequent in wet ravines, swamps, swales in woods and on muddy banks of creeks.

Mass. to Minn., southw. to Fla. and Mo.

22. *Carex Crus-córvi* Shuttlw. Map 442. Frequent in southern Indiana in low open woods, especially flat pin oak woods; occasional in northern Indiana on borders of ponds in woods. Reported from Lake County by Peattie and by Pepoon but no specimens from the county could be located.

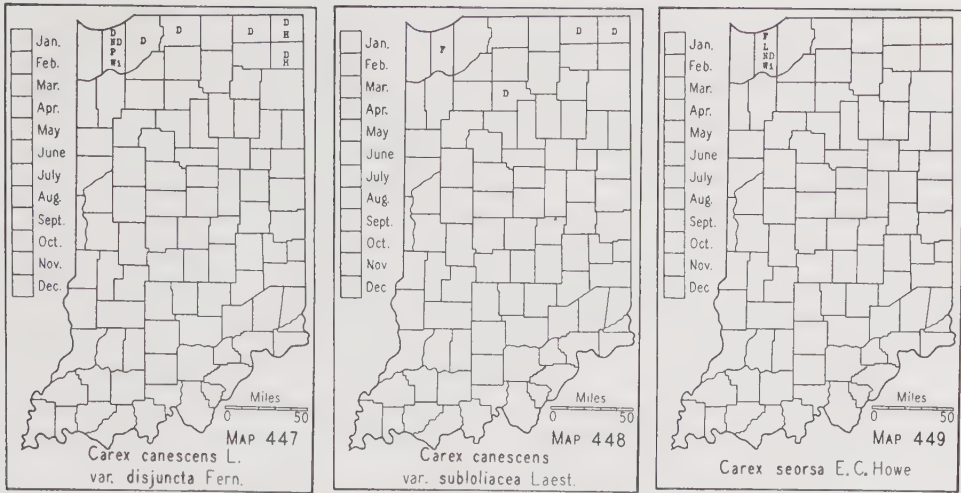
Tenn. southw. to Fla. and Tex.; in the Mississippi Valley from s. Mich., s. Minn., and e. Nebr. to La.

23. *Carex alopecoidea* Tuckerm. Map 443. Known in Indiana from a single collection: Deam no. 41282, in a low place in white oak woods 3 miles south of Yorktown, Delaware County. No specimens could be found to confirm the reports by Peattie and by Pepoon from Lake County, by Pepoon from Porter County, and by Phinney from Jay, Randolph, and Wayne Counties.

Que. to Minn., southw. to N. J. and Iowa.

24. *Carex conjuncta* Boott. Map 444. Frequent to common in central Indiana; frequent elsewhere except in the lake and prairie areas. Its preferred habitat is on wooded alluvial banks of streams, but it is also found in low woods and on moist wooded slopes.

N. J. to D. C., westw. to S. Dak. and Kans.



8. § HELEONÁSTES

Spikes androgynous; perigynia unequally biconvex.....25. *C. disperma*.
Spikes gynaeandrous; perigynia plano-convex.

Lowest bract bristlelike, many times longer than its spike; perigynia 3-3.5 mm long.
.....26. *C. trisperma*.

Lowest bract much shorter; perigynia about 2 mm long.
Perigynia distinctly short-beaked, loosely spreading; leaves green, 1-2.5 mm wide.
(See excluded species no. 5, p. 272).....*C. brunnescens*.

Perigynia apiculate, appressed-ascending, leaves glaucous, 2-4 mm wide.
Spikes 6-12 mm long, remote, the lowest 2-4 cm apart; perigynia 2.3-3 mm long.
.....27. *C. canescens* var. *disjuncta*.

Spikes 4-7 mm long, subapproximate or remote; perigynia barely 2 mm long.
.....27a. *C. canescens* var. *subloliacea*.

25. **Carex disperma** Dewey. (*Carex tenella* Schkuhr.) Map 445. Frequent in the northern counties in sphagnum in tamarack bogs and on mucky borders of lakes. Reported from Putnam County by Coulter but no specimen from that county could be found.

Newf. to Yukon, southw. to N. J., Ind., N. Mex., and Calif.; also in Eurasia.

26. **Carex trisperma** Dewey. Map 446. Restricted to the tamarack bogs of the northernmost counties where it is locally plentiful in sphagnum. No specimen could be located to substantiate Coulter's report from Putnam County.

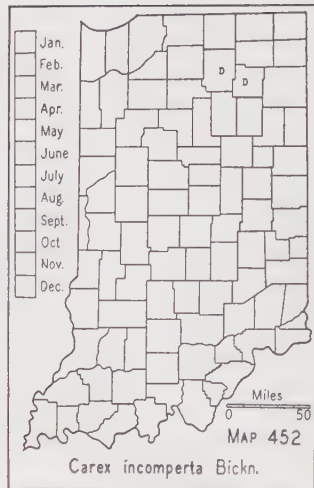
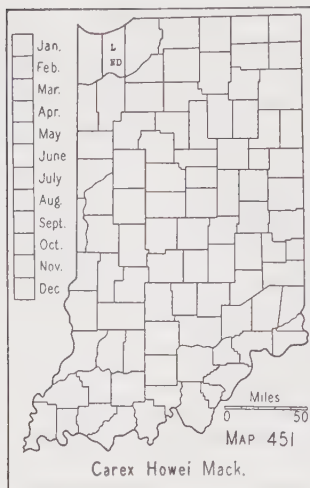
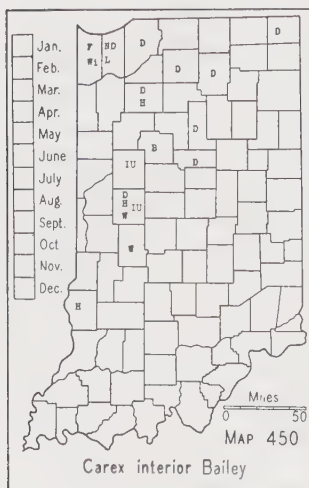
Newf. to Sask., southw. to Md., Ill., and Minn.

27. **Carex canescens** L. var. *disjuncta* Fern. Map 447. Frequent in the counties along the northern border of Indiana in tamarack bogs or low wet woods.

Lab. to Wis., southw. to Pa. and Ind.

27a. **Carex canescens** var. *subloliacea* Laest. Map 448. Infrequent in the northernmost counties in swampy woods and in sphagnum in tamarack bogs.

Lab. to B. C., southw. locally to Conn. and Ind.



9. § STELLULATÆ

Perigynium broadest near the middle, strongly nerved both ventrally and dorsally, with smooth beak..... 28. *C. seorsa*.

Perigynium broadest at the base, with serrulate beak.

Perigynia 2.25-3.25 mm long, the beak very shallowly bidentate.

Perigynia nerveless or few-nerved at the base ventrally, brownish or tawny, the beak with ventral false suture inconspicuous; scales obtuse; anthers 1 mm or less long; leaf blades 1-3 mm wide.....29. *C. interior*.

Perigynia strongly nerved ventrally, deep green, the beak with ventral false suture conspicuous; scales subacute; anthers 1-1.5 mm long; leaf blades 0.25-1 mm wide.....30. *C. Howeii*.

Perigynia 2.75-4.75 mm long, the beak deeply bidentate.

Perigynia deep green at maturity, strongly nerved ventrally, the body suborbicular or very broadly ovate with raised margins, the beak less than half the length of the body, the teeth short, straight, rigid.....31. *C. incompta*.

Perigynia stramineous to brown at maturity, faintly nerved ventrally, the body ovate to ovate-lanceolate (occasionally broadly ovate in *C. sterilis*).

Staminate flowers terminal, basal, or in separate spikes; margin of perigynium slightly if at all raised, setulose-serrulate toward the beak; beak of perigynium half the length of the body or more, the teeth broad, largely hyaline and soft, generally bent or twisted; scales chestnut brown, with lustrous white margins.....32. *C. sterilis*.

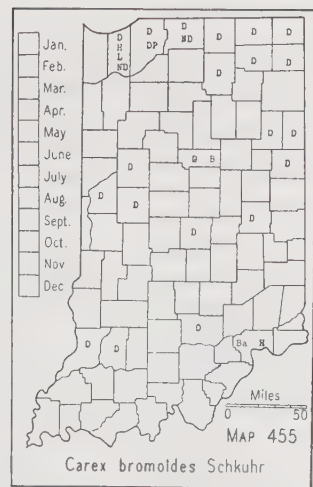
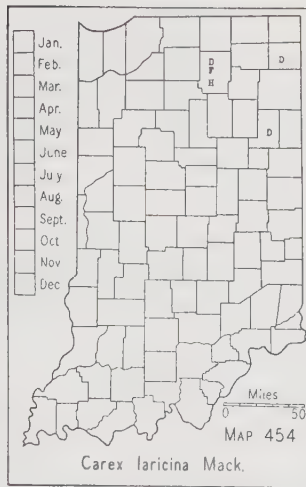
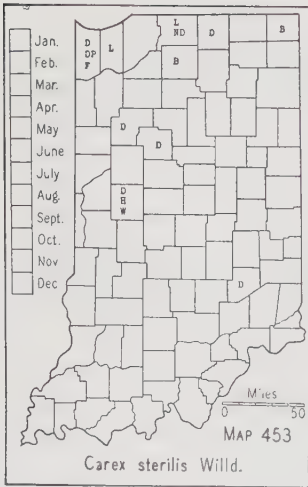
Staminate flowers mostly at the base of the terminal spikes; margin of perigynium serrulate toward the beak, the teeth short, stiff; scales tinged yellowish brown, with narrow hyaline margin.

Perigynia 2.75-3.3 mm long, the beak about a third the length of the body, the teeth triangular; scales somewhat obtuse to acute.....33. *C. laricina*.

Perigynia 3.5-4 mm long, the beak about half the length of the body, the teeth subulate; scales acute to somewhat cuspidate. (See excluded species no. 9, p. 273).....*C. cephalantha*.

28. *Carex seorsa* E. C. Howe. (*Carex rosaeoides* E. C. Howe.) Map 449. Rare in wet woods and tamarack bogs in the dune area. The known localities for this sedge in Indiana are: Dune Park, Keiser, and Tamarack in Porter County and Pine Station (now north Clark Street, Gary) in Lake County.

Mass. to Ga., locally westw. to Ind.



29. **Carex intërior** Bailey. (*Carex scirpoides* Schkuhr, not *Carex scirpoides* Michx.) Map 450. Frequent to common except in southern Indiana; in tamarack bogs and swamps and on springy banks.

Newf. to B. C., southw. to Pa., Ind., Kans., Calif. and Chihuahua.

30. **Carex Hówei** Mack. (Bull. Torrey Bot. Club 37: 245. 1910.) (*Carex interior* var. *capillacea* Bailey and *Carex scirpoides* var. *capillacea* (Bailey) Fern.) Map 451. Known in Indiana from a single collection by M. W. Lyon, Jr.: moist woods on dunes at Mineral Springs, Porter County, June 17, 1923.

N. S. to Fla. and La., westw., locally to Mich. and Ind.

31. **Carex incompërta** Bickn. (*Carex stellulata* var. *excelsior* Fern.) Map 452. Occasional in tamarack bogs, generally in sphagnum.

Mass. and N. Y., to Mich. and Ind., southw. to Fla. and Tex.

32. **Carex stërilis** Willd. (*Carex scirpoides* Schkuhr, in part.) Map 453. Frequent on marshy banks of streams and occasional in open swamps, bogs, and springy places in woods. Not known from the unglaciated area.

Newf. to Minn., southw. to N. J., Pa., and Ill.

33. **Carex laricina** Mack. (N. Amer. Flora 18: 113. 1931.) Map 454. Rare, in tamarack bogs and on mucky borders of lakes in the northeastern counties.

The type collection of this species is Deam no. 10927 from a tamarack bog a mile south of Leesburg, Kosciusko County. The other two Indiana stations for it are: in a bog a mile south of Garrett, De Kalb County, and in sphagnum on the border of a small lake in Jackson Twp., Wells County.

Ont. and nw. Pa. to Wis., and southw. to Ind.

10. § DEWEYANAE

34. *Carex bromoides* Schkuhr. Map 455. Frequent to common except in the unglaciated area, in wet woods, swamps, and bogs and on borders of ponds and springy banks of streams.

Que. to Wis., southw. to Fla. and La.

11. § OVÀLES

Wing of perigynium not narrowed near the middle of the body; leaf blades of sterile culms erect or ascending, usually clustered toward the top; sterile culms often poorly developed.

Perigynia not obovate, widest near the middle or base.

Leaf sheaths strongly white-hyaline ventrally.

Perigynia lanceolate to narrowly ovate-lanceolate, 3 to 4 times as long as wide.35. *C. scoparia*.

Perigynia ovate-lanceolate or broader, at most twice as long as wide.

Perigynia narrowly to broadly ovate, 3-4 mm long.

Leaf blades 1.5-4.5 (averaging 2.5) mm wide; sheaths not mottled with green and white dorsally.

Perigynia 3-3.5 mm long; spikes closely aggregated, not clavate at base.36. *C. Bebbii*.

Perigynia 3.5-4.5 mm long; spikes not aggregated, usually in a flexuous, moniliform inflorescence, clavate at base.37. *C. tenera*.

Leaf blades 2.5-6 (averaging 4) mm wide; sheaths mottled with green and white dorsally; perigynia less abruptly beaked and beak narrower than in *C. tenera*.38. *C. normalis*.

Perigynia (2.75) 3.5-6.5 mm long, the body suborbicular.

Perigynia 3.5-5.5 mm long, thick, coriaceous or subcoriaceous, usually plano-convex.

Perigynia averaging (2.75) 3.5-4 mm long, the beak half the length of the body or more; achene 1.5 mm long, oblong-ovoid; spikes in a moniliform inflorescence.39. *C. festucea*.

Perigynia 3.75-5.5 mm long, the beak less than half the length of the body; achenes 1.75-2 mm long, orbicular or suborbicular when fully mature; spikes aggregated or in a moniliform inflorescence.

Perigynia ovate, submembranaceous, few-nerved ventrally, broadest near the base, tapering into the beak; the beak broader than in *C. brevior*, especially toward the base.40. *C. molesta*.

Perigynia broadly ovate to suborbicular, coriaceous, usually nerveless or nearly so ventrally, broadest near the middle, abruptly contracted into the beak.41. *C. brevior*.

Perigynia 5.6-6.5 mm long, flat and thin, nearly transparent.42. *C. Bicknellii*.

Leaf sheaths green and strongly nerved ventrally nearly to the mouth.

Scales cuspidate or even obtuse; perigynia nerveless or nearly so ventrally; spikes 2-5, aggregated into a stiff head.43. *C. suberecta*.

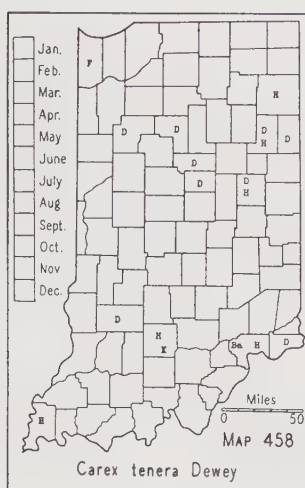
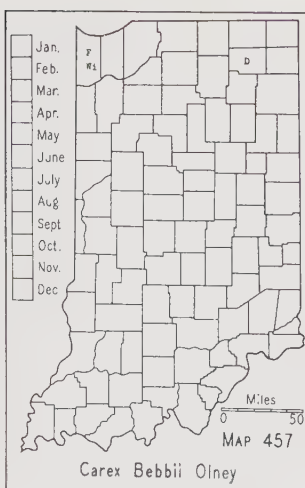
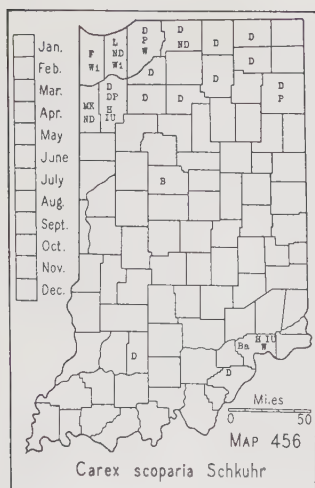
Scales long-acuminate to aristate; perigynia nerved ventrally; spikes 4-8, in a very flexuous inflorescence.44. *C. Richii*.

Perigynia obovate, the body widest near the top.

Scales obtuse to short-acuminate; achenes sessile or substipitate; perigynia 1.5-3 mm wide.

Tips of perigynia appressed; perigynia with body rounded at apex; spikes approximate or aggregated, greenish to silvery brown.

Perigynia nerveless ventrally; spikes 5-25, densely aggregated; leaf blades of sterile culms 3.5-5 mm wide.45. *C. cumulata*.



Perigynia nerved ventrally; spikes 3-10, aggregated or somewhat separate; leaf blades of sterile culms 2.5-3 mm wide; scales either nearly equaling perigynia or blunt.....46. *C. Longii*.

Tips of perigynia spreading; perigynia with body truncate-rounded at apex, very abruptly beaked; spikes not aggregated, not silvery; scales acute, conspicuously shorter than the perigynia.....47. *C. albolutescens*.

Scales long-acuminate to aristate; achenes slenderly stipitate; perigynia 2.5-4 mm wide.....48. *C. alata*.

Wing of perigynium rather abruptly narrowed near the middle of the body; leaf blades of sterile culms widely spreading, numerous, not clustered at the apex; sterile culms strongly developed.

Perigynia 3-7 mm long; spikes 4-15 mm long; achenes oblong-oval, 1.5 mm long; ligule much longer than wide.

Tips of perigynia appressed or ascending; perigynia thin, scarcely distended over the achenes.....49. *C. tribuloides*.

Tips of perigynia recurved or widely spreading; perigynia firm, obviously distended over the achenes.....50. *C. cristatella*.

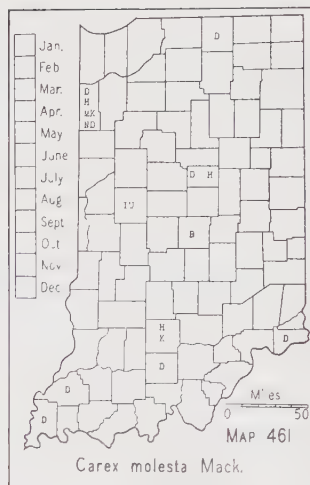
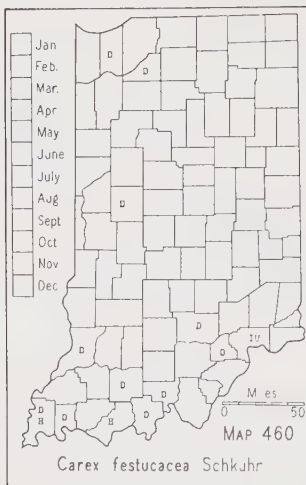
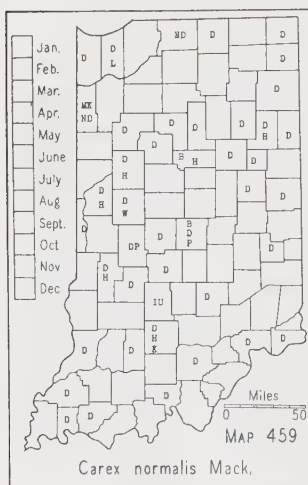
Perigynia 7-10 mm long; spikes 16-25 mm long; achenes linear-oblong, 2.5 mm long; ligule as wide as long.....51. *C. muskingumensis*.

35. *Carex scoparia* Schkuhr. (Including *Carex scoparia* var. *condensa* Fern.) Map 456. Common in marshes and open swampy places; occasional in low open woods and on sandy lake borders. This sedge is frequently the dominant plant in marshes or "sedge meadows" where it is usually associated with *Juncus effusus* var. *solutus*, *Juncus Dudleyi*, and *Carex vulpinoidea*.

Newf. to B. C., southw. to S. C., N. Mex., and Oreg.

36. *Carex Bebbii* Olney. Map 457. Infrequent in marshes and interdunal swales in Lake County. In Noble County a single collection was made by Deam in a ditch along a railroad a mile east of Kimmel.

Plants of *Carex Bebbii* lacking sterile culms are occasionally difficult to distinguish from *C. cristatella* especially before the perigynia are fully mature. Leaf blades of *C. Bebbii*, however, vary from 2 to 4.5 mm broad, those of *C. cristatella* from 3 to 7 mm broad. In *C. Bebbii* the pistil-



late scales are relatively longer, acuminate to acute or occasionally blunt; in *C. cristatella* the scales are shorter, with dilated hyaline blunt tips.

Umbach no. 3651 and Bebb nos. 541 and 874, all from Lake County, are intermediate between *C. Bebbii* and *C. cristatella* in most of their characters. Similar material from Michigan has been identified by Mackenzie as a hybrid between the two species.

Newf. to B. C., southw. to N. J., Ill., Colo., and Wash.

37. *Carex ténera* Dewey. (*Carex straminea* of recent authors, not Willd.; *Carex tenera* var. *echinodes* (Fern.) Wieg.) Map 458. Frequent in or near the lake area and in the southern counties in dry or moist, usually open, woods, on borders of ponds in woods, and along railroad ditches. Generally the heads are fewer-flowered in this sedge than in other species of § *Ovales* and this condition and the widely spreading perigynia sometimes result in a superficial resemblance to species of § *Stellulatae*.

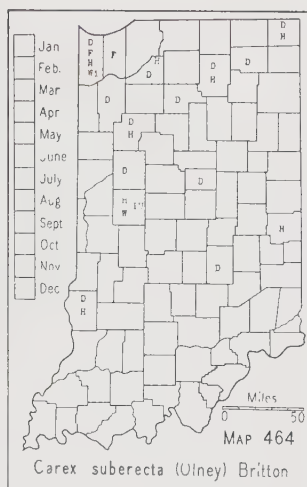
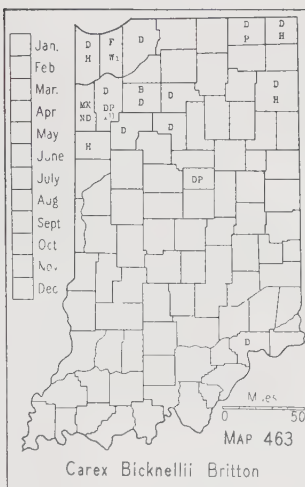
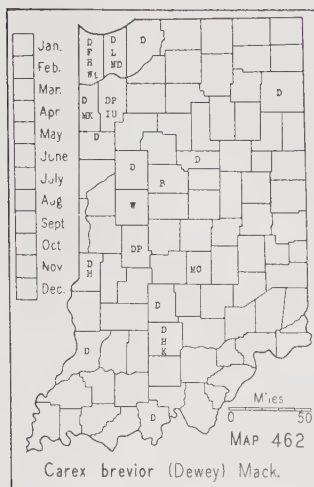
Que. to Alberta, southw. to D. C., N. C., and Ill.

38. *Carex normalis* Mack. (*Carex mirabilis* Dewey, not Host.) Map 459. Very common in dry or moist woods and thickets. In the eastern part of its range this species seems to be partial to dry open habitats, but in Indiana it has been most often collected in low or flat woods, shaded ravines, marshy habitats on the borders of ponds, and on the flood plains of streams.

Maine to Man., southw. to N. C. and Okla.

39. *Carex festucacea* Schkuhr. (Bull. Torrey Bot. Club 42: 608. 1915.) Map 460. Frequent in southern Indiana in low flat woods, especially pin oak woods, and on moist wooded slopes; occasional in roadside and railroad ditches in the northern counties.

Mass. to Ind. and Iowa, southw. to Ga. and La.



40. *Carex moléstá* Mack. (N. Amer. Flora 18: 151. 1931.) Map 461. Infrequent to rare along railroad sidings and roadsides and in ditches and dry woodlands.

N. Y. to Kans. and Nebr.

41. *Carex brévior* (Dewey) Mack. (*Carex festucacea* var. *brevior* (Dewey) Fern.) Map 462. Common in dry open woods and moist ditches and along railroads and roadsides, especially in the prairie area.

Que. to B. C., southw. to D. C., Tenn., Tex., N. Mex., and Oreg.

42. *Carex Bicknellii* Britt. Map 463. Frequent to common along railroad sidings and grassy roadsides in northern Indiana; rare in the southern counties and not known from the unglaciated area. Occasional in low, moist sandy habitats; very rare in open woods.

Maine to Sask., southw. to Del., Ark., and Okla.

43. *Carex suberécta* (Olney) Britt. Map 464. Frequent to common, except in the southern counties, in open swamps, marshes, and moist ditches and on wet sandy borders of lakes. Not known from the unglaciated area.

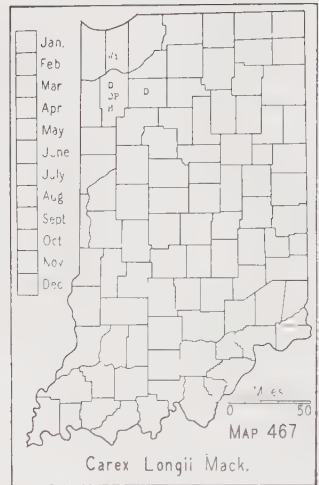
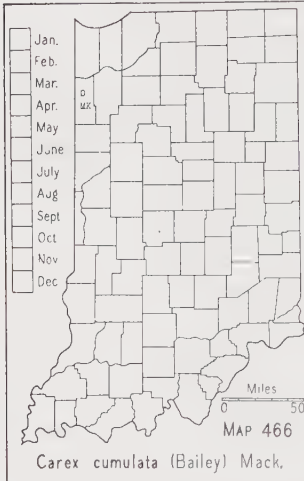
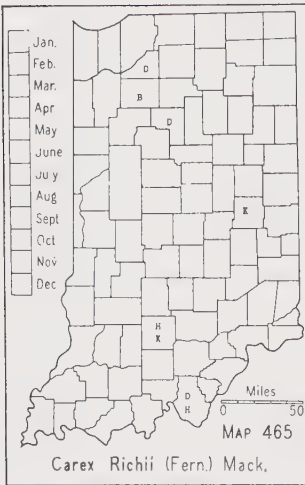
Ont. to Va., Minn., and Mo.

44. *Carex Richii* (Fern.) Mack. (*Carex hormathodes* var. *Richii* Fern. and *Carex straminea* of Svenson, Rhodora 40: 329-330. 1938.) Map 465. Rare and local in open swampy woods and borders of ponds in woods, less frequently in open non-calcareous marshes or swamps. The known stations are all in either the lake area or the unglaciated area.

Mass. to N. J. and D. C., westw. to Mich. and Ind.

45. *Carex cumulàta* (Bailey) Mack. (Bull. Torrey Bot. Club 49: 366. 1922.) (*Carex albolutescens* var. *cumulata* Bailey.) Map 466. Known in Indiana only from Newton County where in 1936 a colony was found by Miss Madge McKee along a roadside ditch 3 miles northwest of Morocco. It is a local species throughout most of its range.

N. S. to N. J., westw. to Sask.



46. **Carex Lóngii** Mack. (Bull. Torrey Bot. Club 49: 372. 1922.) (*Carex albolutescens* of recent authors, not Schwein.) Map 467. Infrequent in the northwestern counties where it is found in acid swamps and sloughs, less often in sandy interdunal swales.

Mass. to Venezuela; nw. Ind. and sw. Mich.; also in Bermuda.

47. **Carex albolutés**cens Schwein. (Bull. Torrey Bot. Club 49: 372. 1922.) (*Carex straminea* of Mack., probably not of Willd., Rhodora 40: 329-330. 1938.) Map 468. Frequent in southern Indiana in low flat woods, associated principally with sweet gum and pin oak. It also is found rarely along the northern border of the state where it occurs in low woods, associated with beech and sugar maple, and occasionally in swamps.

N. S. southw. along the coast to Fla., westw. along the Gulf to Tex. and northw. in the Mississippi Valley to Ind. and sw. Mich.

48. **Carex alà**ta Torr. Map 469. Infrequent in swamps and sandy swales in the lake area. It is seldom plentiful in any locality; frequently only one or two plants can be found at a station.

Mass. to Fla. and Tex., westw. to Mich., Ind., and Mo.

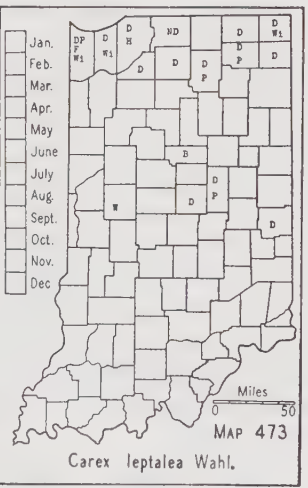
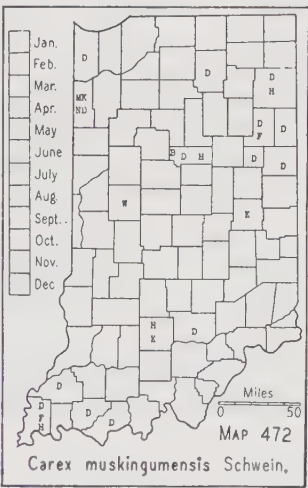
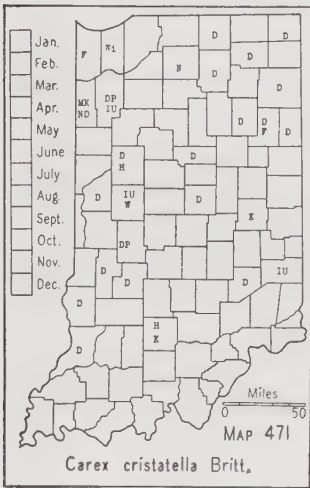
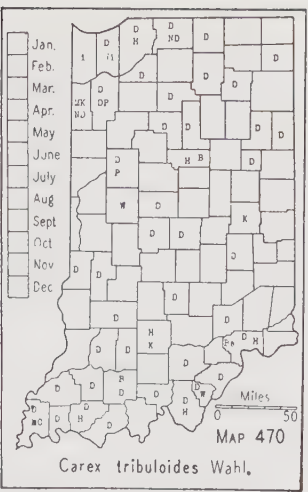
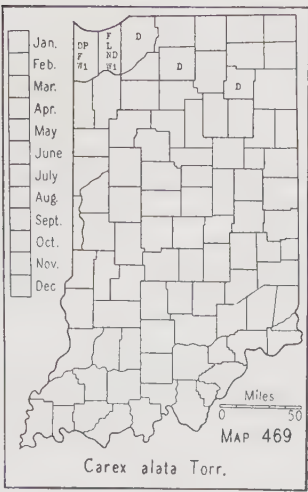
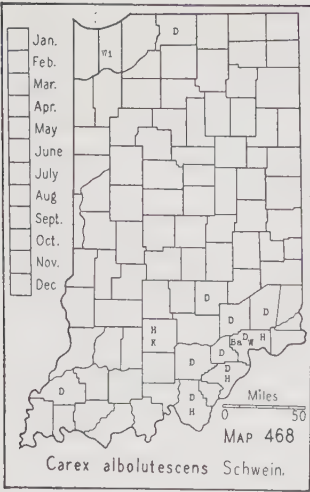
49. **Carex tribuloides** Wahl. (Including *Carex tribuloides* var. *sangamonensis* Clokey.) Map 470. Very common throughout the state in swamps, open marshes, low woods, and ditches and on the low borders of streams and ponds.

Que. to Minn., southw. to Fla. and La.

50. **Carex cristatè**lla Britt. (*Carex cristata* Schwein., not Clairv.) Map 471. Common in low open woods, swamps, marshes, and roadside ditches and on flood plains and banks of streams. Rare in the unglaciated area.

Mass. to N. Dak., southw. to Va. and Mo.

51. **Carex muskinguménsis** Schwein. Map 472. Frequent in low wet places in woods where it often forms extensive and pure stands if not



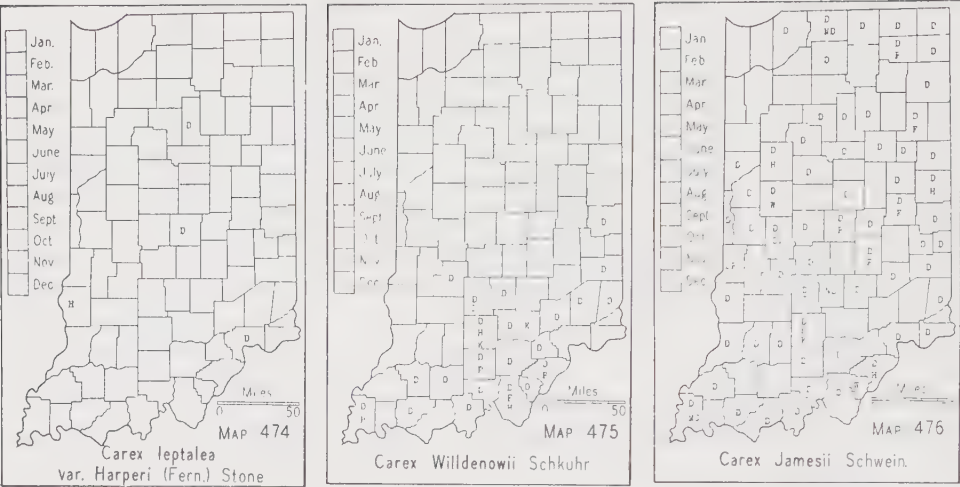
obstructed by undergrowth. Occasional in buttonbush swamps and wet woods and on flood plains. Northward it is usually found with bur oak. Ohio and Ky. to Man., Kans., and Ark.

12. § POLYTRICHOIDEAE

Perigynia 2.5-3.5 mm long, slightly overlapping; achenes lustrous, obtusely angled.... 52. *C. leptalea*.
Perigynia 4-5 mm long, strongly overlapping; achenes barely lustrous, sharply angled.. 52a. *C. leptalea* var. *Harperi*.

52. *Carex leptalea* Wahl. Map 473. Common in northern Indiana in tamarack bogs and occasional in wet woods. Infrequent in central Indiana, in swamps and on banks of streams. It is generally plentiful wherever found and in tamarack bogs it is usually associated with *Carex trisperma*. Newf. to B. C., southw. to Pa., Mo., Colo., and Calif.

52a. *Carex leptalea* var. *Hárperi* (Fern.) Stone. (*Carex Harperi* Fern.) Map 474. Rare in central and southern Indiana. In Indiana its



habitat is almost invariably at the springy bases of high wooded river bluffs and terraces.
N. J. to Fla., westw. to Ind. and Tex.

13. § PHYLLOSTACHYAE

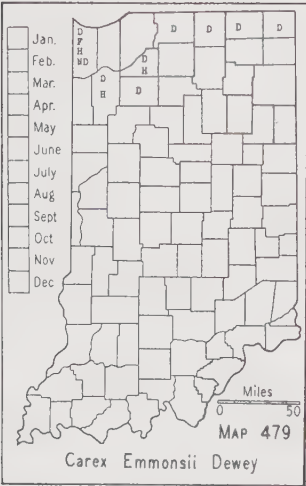
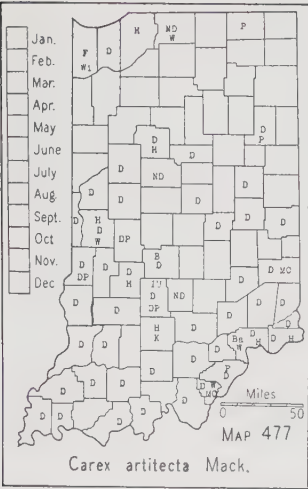
Bodies of perigynia oblong-oval; lowest scale 5-15 mm long; pistillate flowers 3-10; staminate scales 2-2.4 mm long, obtuse or somewhat acute; staminate spike 0.7-0.9 mm in diameter.....53. *C. Willdenowii*.
Bodies of perigynia subglobose; lowest scale 15-45 mm long; pistillate flowers 2-3; staminate scales 1.5-1.8 mm long, truncate, erose, with a dark transverse band near the apex; staminate spike 0.4-0.5 mm in diameter.....54. *C. Jamesii*.

53. *Carex Willdenowii* Schkuhr. Map 475. Common in southern Indiana (mostly in the unglaciated area and the “flats”) on dry wooded, especially oak, slopes, generally in poor, sandy, acid soils; rarely in low beech or pin oak woods.
Vt. to Ont. and Ind., southw. to Ga. and Tex.

54. *Carex Jamesii* Schwein. Map 476. Very common throughout Indiana except in the northwestern counties from which we have no records. It is a plant of rich woods, occurring in dry neutral soil, especially on the slopes of deep ravines. It is most frequently associated with either *Carex Hitchcockiana* or *C. oligocarpa* or both.
Ont. and N. Y. to Iowa, southw. to W. Va., Mo., and Kans.

14. § MONTANAE

Fertile culms all alike, elongated (7-40 cm long), bearing both staminate and pistillate spikes, basal spikes absent.
Body of perigynium elliptic to oblong-ovoid, much longer than wide; staminate spike slender.
Perigynia conspicuous in the spikes, not concealed by the scales, 2.5-3 mm long.
Staminate scales obtuse or short-acute, closely appressed, not cucullate at the tip, the midvein usually not extending to the tip; pistillate spikes usually not aggregated; culms erect.....55. *C. artitecta*.
Staminate scales ascending to loosely spreading, the midvein extending to the tip.
Beaks of perigynia 1.75-2 mm long; staminate spike peduncled, conspicuous,



10-16 mm long, 1.6-2.3 mm wide; pistillate spikes not at all aggregated; culms erect.....55a. *C. artitecta* var. *subtilirostris*.
Beaks of perigynia 0.5-1 mm long; staminate spike sessile, usually inconspicuous, 2-8 mm long, 1.5 mm wide; at least the upper pistillate spikes closely aggregated or congested; culms weak, more or less arcuate.....56. *C. Emmonsii*.

Perigynia inconspicuous in the spikes, largely concealed by the scales, 3-4 mm long.....57. *C. nigromarginata*.

Body of perigynium suborbicular to somewhat obovoid, about as long as wide.
Ligule conspicuous, longer than wide; lowest bract truncate or bifid, abruptly awned; leaf blades 2.5-4.5 mm wide; culms generally aphyllopodic, little fibrillose at the base, without long, horizontal stolons.....58. *C. communis*.

Ligule short, much wider than long; lowest bract usually gradually acuminate; leaf blades 2.5 (very rarely 3) mm wide or less; culms generally phyllopodic, conspicuously fibrillose at the base, with long horizontal stolons; staminate spike stout.
Mature perigynia 1.75-2 mm wide, the body suborbicular in cross section.....59. *C. heliophila*.

Mature perigynia about 1.5 mm wide, the body obtusely trigonous in cross section.....60. *C. pennsylvanica*.

Fertile culms of two types, some short (1-5 cm long), partly hidden among the densely tufted bases and bearing only pistillate spikes, others elongated (5-11 cm long) and bearing staminate spikes only or both staminate and pistillate spikes.

Leaf blades rather thin, not stiff, erect or ascending, 1.5-3 mm wide; perigynia membranaceous, 2.25-4 mm long, the body short-pubescent above.

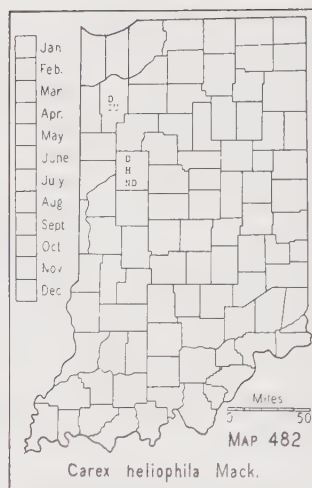
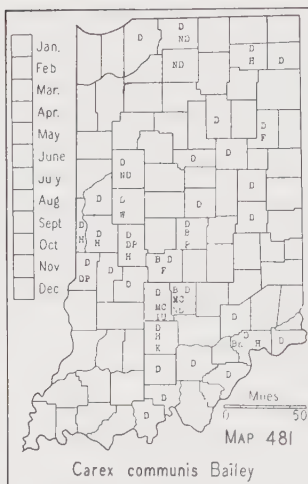
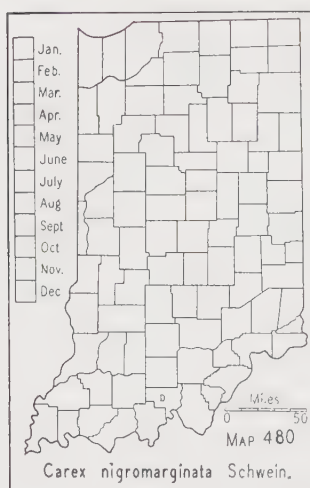
Perigynia 2.25-3.25 mm long, 1-1.25 mm wide, the beak about half the length of the body; achenes orbicular-obovoid.....61. *C. umbellata*.

Perigynia 3.25-4 mm long, the beak nearly the length of the body; achenes oblong-obovoid, minutely roughened.....62. *C. rugosperma*.

Leaf blades thick, rigid, widely spreading at maturity, 2-4.5 mm wide; perigynia subcoriaceous, 3.5-4.5 mm long, the body glabrous or very sparsely pubescent above.....63. *C. tonsa*.

55. *Carex artitecta* Mack. (*Carex varia* Muhl., not Lumnitzer nor Host.) Map 477. Common in dry open woods, especially on rocky white oak slopes; occasional in thickets or low woods.

Vt. to Iowa, southw. to S. C. and Okla.



55a. *Carex artitecta* var. *subtiliróstris* Hermann. (Rhodora 40: 79. 1938.) Map 478. Known in Indiana only from the type collection: Deam no. 54764, wooded slope along a small creek about 3 miles northwest of Clinton, Vermillion County, May 5, 1934.

Ind. and Tenn.

56. *Carex Emmónsii* Dewey. (*Carex albicans* of authors, doubtfully of Willd., Rhodora 40: 330-331. 1938.) Map 479. A coastal plain species found sparingly in the northern counties of the lake area. It grows in sandy open woods and on moist sandy borders of marshes or thickets in the dunes, but its preferred habitat is dry black oak ridges.

Indiana plants tend to have the culms longer and less arcuate and the pistillate spikes fewer and less congested than in the characteristic plant of the Atlantic Coastal Plain.

N. S. to Fla. mostly along the coast, and about the Great Lakes.

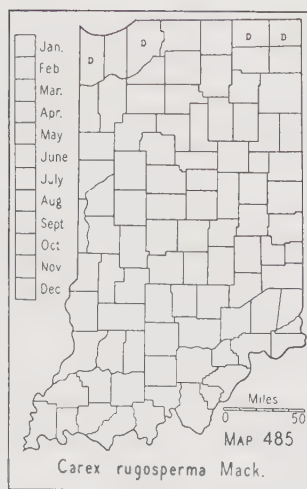
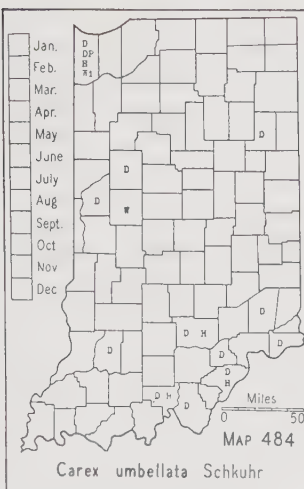
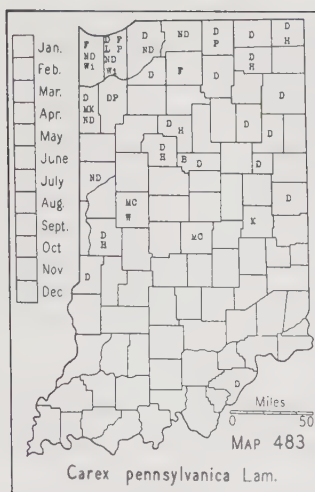
57. *Carex nigromarginata* Schwein. Map 480. A southern and eastern species known in Indiana from a single collection: Deam no. 44074A, top of the wooded bluff of the Ohio River, about a quarter of a mile north of Fredonia, Crawford County, April 24, 1927.

Conn. to Tenn., Fla., and La., mostly along the coast, and northw. in the Mississippi Valley to Mo. and s. Ind.

58. *Carex communis* Bailey. Map 481. Common in dry woods of all types, particularly on rocky slopes. It is one of the earliest sedges to flower and fruit.

Deam no. 33881 (Gray Herbarium) is abnormal in having the leaf sheaths prolonged laterally and ventrally, forming auricles reaching almost to the summit of the ligule. Typically the leaf sheaths are deeply concave at the mouth.

N. S. to Minn., southw. to Ga., Ky., and Ark.



59. *Carex heliophila* Mack. (Torreya 13: 15. 1913.) (*Carex pennsylvanica* var. *digyna* Böck.) Map 482. A prairie species represented from Indiana by two collections by Deam: in a sandy black oak woods 2 miles southwest of Tefft, Jasper County, June 6, 1924, and on top of the high gravelly bank of Big Wea Creek terrace 4 miles southwest of Lafayette, Tippecanoe County, June 3, 1924, and May 24, 1932. At the latter station it was plentiful in an open black oak-shagbark hickory grove with such other prairie or western species as *Androsace occidentalis*, *Petalostemum purpureum*, *Arenaria patula*, *Opuntia Rafinesquii*, and, nearby, *Muhlenbergia cuspidata*, *Sporobolus clandestinus*, and *Erysimum asperum*. Other associated plants were *Festuca octoflora*, *Poa pratensis*, *Penstemon hirsutus*, *Houstonia longifolia*, and *Acerates viridiflora*.

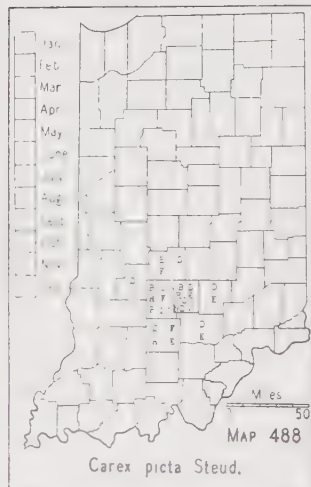
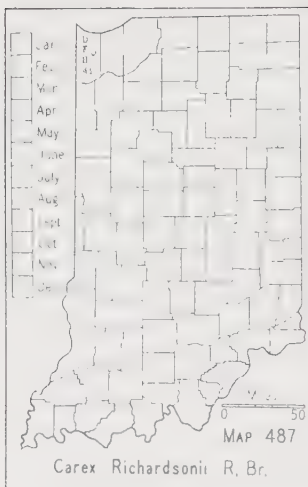
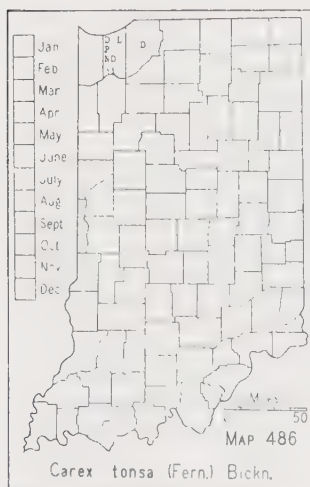
Man. to Alberta, southw. to Ind., Mo., and N. Mex.

60. *Carex pennsylvanica* Lam. Map 483. Common in northern Indiana, less frequent southward, and rare or absent from the southernmost counties. Like *Carex communis* it is a species flowering in early spring, found in similar localities but preferring somewhat more open habitats and generally in more sterile soils. It usually forms rather extensive colonies, sometimes comprising the dominant floor cover in open oak woods.

N. S. to N. Dak., southw. to S. C., Tenn., and Iowa.

61. *Carex umbellata* Schkuhr. (Bull. Torrey Bot. Club 42: 621. 1915.) (*Carex abdita* Bickn. and *Carex umbellata* var. *brevirostris* Boott.) Map 484. Infrequent in northern Indiana in dry sandy soil, usually in open woods; frequent in southeastern Indiana on crests of rocky wooded ridges and river bluffs. This and the two following species may be more common than the records indicate because they are low, inconspicuous plants, easily overlooked by collectors.

In this species the longest peduncles are typically not over 8 cm in length and generally bear a staminate spike only. But on the dunes the prevalent form has elongated peduncles 12-20 cm in length which usually bear one or more pistillate spikes in addition to the staminate. This



form is analogous to the plant which has been called *Carex umbellata* f. *vicina* (Dewey) Wieg. but the type specimen upon which that form is based is the long-beaked plant (*C. rugosperma* Mack.) so that the name cannot be applied to the Indiana plant.

Newf. to B. C., southw. to D. C. and Ill.

62. *Carex rugosperma* Mack. (Bull. Torrey Bot. Club 42: 621. 1915.) (*Carex umbellata* of many recent authors, not Schkuhr.) Map 485. Infrequent in the northern tier of counties. It is found in dry, sandy oak woods, open drained low woods, and on borders of drained marshes.

N. S. to Minn., southw. to Md. and Ind.

63. *Carex tonsa* (Fern.) Bickn. (Bull. Torrey Bot. Club 35: 492. 1908.) (*Carex umbellata* var. *tonsa* Fern.) Map 486. Frequent in the dune area on low, open dunes and in dry, open woods.

Que. to Alberta, southw. to D. C. and Ind.

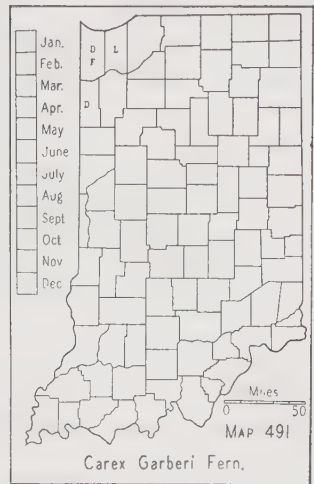
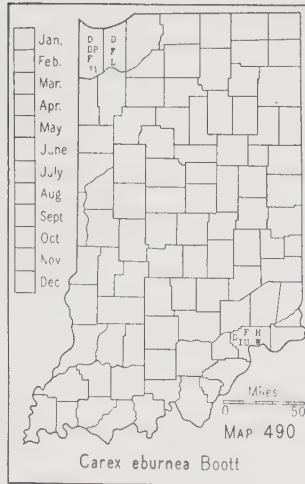
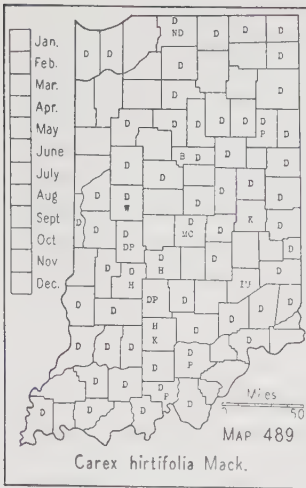
15. § DIGITATÆ

Basal spikes present; terminal spikes androgynous; pistillate scales abruptly cuspidate or short-awned. (See excluded species no. 15, p. 274.).....*C. pedunculata*.

Basal spikes absent; terminal spike staminate; pistillate scales blunt to acute.....
.....64. *C. Richardsonii*.

64. *Carex Richardsonii* R. Br. Map 487. Known in Indiana only from the dunes at Pine, Lake county. Pine is now within Gary on the east side of Clark Street, an eighth of a mile south of Lake Michigan. Here on a sandy knoll at the edge of a marsh, *Carex Richardsonii* is associated with *Andropogon scoparius*, *Castilleja coccinea*, *Erigeron pulchellus*, *Senecio pauperculus* var. *Balsamitæ*, *Lithospermum canescens*, *Potentilla fruticosa*, *Carex umbellata* and *C. aurea*, *Liatris spicata*, *Betula papyrifera*, *Pedicularis canadensis*, *Krigia biflora*, *Rhus trilobata* var. *arenaria*, *R. radicans*, *R. Vernix*, *Arabis lyrata*, *Hypoxis hirsuta*, and *Koeleria cristata*.

This is one of the rarest sedges in the eastern states where it is very local in its distribution (although its known range seems to indicate that



it occurs generally at or near the Niagara Escarpment) and its season is very brief. After flowering it matures its fruit rapidly and then completely withers away. At Pine it is in its prime about May 30. Of the six known collections made from this station four were made on May 29 (1897; 1900; 1904, and 1935), one on May 12 (1877) and one on June 13 (1935), but at the last date the majority of the perigynia had fallen and the plants were already badly withered.

Western N. Y. and Ont. to Alberta, southw. to Ill. and S. Dak.

16. § PÍCTAE

65. *Carex picta* Steud. Map 488. In Indiana in the unglaciated region only where it is local and largely confined to the northern half of the knob area (Chestnut Oak Upland). It is found on wooded hilltops under oak, chestnut, and beech, generally forming rather extensive colonies. Deam has noted that it "has the habit of growing in circular tufts with a hollow center" and from this characteristic the species may be readily recognized long after its flowering and fruiting season is past. It is the earliest sedge to bloom in the state, coming into flower in early April or even in late March.

Ind., Ala., and La.

17. § TRIQUÈTRAE

66. *Carex hirtifolia* Mack. (Bull. Torrey Bot. Club 37: 244. 1910.) (*Carex pubescens* Muhl., not Poir.) Map 489. Very common throughout the state in woodland habitats of all types, showing a slight preference for beech woods.

N. B. to Minn., southw. to D. C., Ky., and Kans.

18. § ÁLBAE

67. *Carex eburnea* Boott. Map 490. Apparently restricted to the northwestern and southeastern corners of the state. In the north it is known

only on the dunes in dry sandy thickets and in open situations. In southern Indiana it is found in wet crevices of limestone bluffs near the Ohio River.

Carex eburnea retains its fruit over a longer period than any of our other species due to the tendency of the perigynia to persist in the spikes long after maturity. Although the fruit ripens from May to July most of the plants have dropped relatively few of their perigynia, as a rule, by October and frequently the old prostrate culms from the preceding year will be found to have spikes in which many perigynia are still firmly attached.

Newf. to B. C., southw. to Va., Mo., and Nebr.

19. § BICÓLORES

Pistillate scales averaging three fourths the length of the perigynia or more, reddish brown, appressed; terminal spike androgynous, rarely staminate; mature perigynia white-pulverulent, elliptic-obovoid, not translucent or fleshy. . . . 68. *C. Garberi*.

Pistillate scales averaging half the length of the perigynia or less, generally pale yellowish brown and cuspidate, widely spreading at maturity; terminal spike staminate, rarely with a few perigynia at the base; mature perigynia golden yellow or brownish, orbicular-obovoid, translucent, fleshy. 69. *C. aurea*.

68. *Carex Gárberi* Fern. (Rhodora 37: 253. 1935.) (*Carex bicolor* of recent American authors, not All. and *Carex Hassei* of recent authors, not Bailey.) Map 491. Infrequent in the lake area (mostly in the dune region) where it grows along the wet sandy edges of swales in the dunes and on old lake beds, chiefly in calcareous soils. It is frequently associated with *Carex Cravei*, *C. tetanica*, *C. Meadii*, *C. viridula*, and *C. Haleana*. Apparently it was formerly more plentiful than at present as collections from the Indiana dunes forty and fifty years ago are much more numerous in herbaria than recent collections. At Pine, where this species is closely associated with *Carex tetanica*, plants of the latter species showing many characteristics of *C. Garberi* and plants of *C. Garberi* having characteristics of *C. tetanica* are frequent. The general aspect of such plants and the conditions under which they are found are strongly suggestive of hybridization.

Que. to Mich., Ind., and Wis.; also in Alberta and B. C.

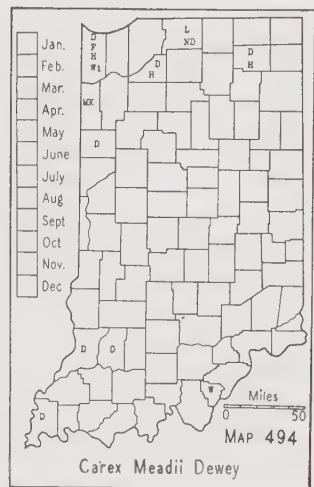
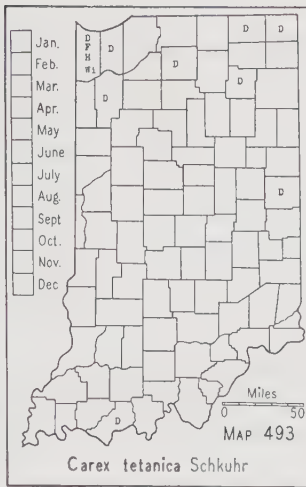
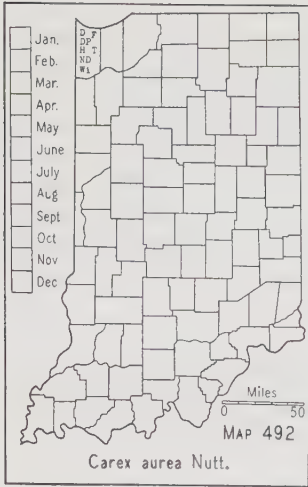
69. *Carex aúrea* Nutt. Map 492. Frequent on the dunes in Lake County. Its habitat is often that of *Carex Garberi*, on moist sandy edges of swales and similar situations, but it is also frequently found in richer, mucky soils such as on the border of sloughs and of low wet woods.

Newf. to B. C., southw. to Conn., Ind., Nebr., N. Mex., and Calif.

20. § PANÍCEAE

Culms phyllopodic; stolons deep-seated, slender, whitish; plants of open marly or sandy habitats.

Pistillate spikes linear to linear-oblong, 3.5-4.5 mm wide; perigynia appressed or ascending, 2.5-3.5 mm long, slightly excurved and tapering to the apex, very minutely beaked or beakless; leaf blades 2-4 mm wide; culms slender. 70. *C. tetanica*.



Pistillate spikes oblong or linear-oblong, 5-8 mm wide; perigynia spreading at maturity, 3-5 mm long, abruptly narrowed at the apex into a minute, more or less strongly bent beak; leaf blades 2.7-7 mm wide; culms stout... 71. *C. Meadii*. Culms strongly aphyllopodic; stolons superficial; plants of rich humus in shady woods.
 72. *C. Woodii*.

70. *Carex tetanica* Schkuhr. Map 493. Infrequent in northern Indiana in marly or sandy soils, bordering marshes and lakes; becoming frequent to locally common on the dunes where it occurs especially on low sandy interdunal flats; rare in southern Indiana, in open post oak flats.

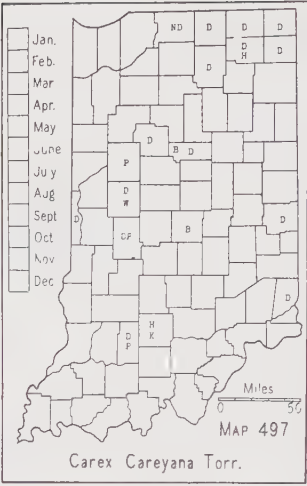
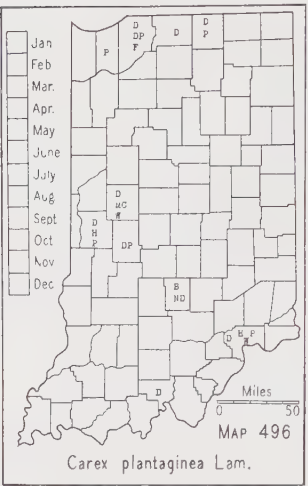
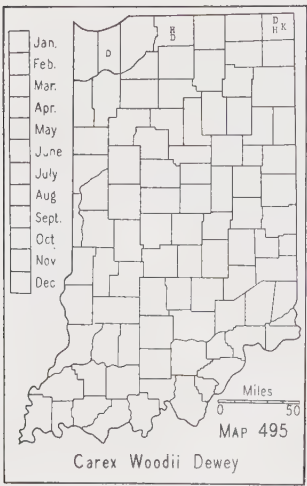
Mass. to Alberta, southw. to Pa. and Iowa.

71. *Carex Meadii* Dewey. (*Carex tetanica* var. *Meadii* (Dewey) Bailey.) Map 494. Infrequent in the lake area and in southeastern Indiana; frequent in the dune area. Its habitat is much that of *C. tetanica* except that *C. Meadii* also occurs in drier soils and in even more open situations. *Carex Meadii* as a rule is readily distinct from *C. tetanica* except at Pine in Lake County where the two species are closely associated and intermediate forms are frequent. The same is true of *C. tetanica* and *C. Garberi*, at this station, and, as noted under the latter species, such transitional forms may be due to hybridization.

N. J. to Sask., southw. to Ga. and Tex.

72. *Carex Woodii* Dewey. (*Carex tetanica* var. *Woodii* (Dewey) Wood; *Carex colorata* Mack.) Map 495. Rare in the northern counties. So far this species is known in Indiana from three collections only, all by Deam: in a moist red and white oak woods 4 miles northwest of Valparaiso, Porter County, June 2, 1927, in a rich beech-maple woods 1 mile south-east of North Liberty, St. Joseph County, May 23, 1934, and June 13, 1935 and at the base of a sugar maple slope in Steuben County. At the latter locality it was associated with *Impatiens biflora*, *Solidago caesia*, *Viola canadensis*, *Smilacina racemosa*, *Polygonum virginianum*, *Isopyrum biternatum*, and *Caulophyllum thalictroides*.

N. Y. to Man., southw. to D. C. and Mo.



21. § LAXIFLORAE

- Bract-sheaths, base of culms, and staminate scales strongly red-tinged.*
- Leaf blades of fertile culms rudimentary, the sheaths concave at the mouth; bracts bladeless; perigynia 4-5 mm long.....73. *C. plantaginea*.
- Leaf blades of fertile culms well-developed, the sheaths prolonged upward at the mouth; bracts with blades well-developed; perigynia 5.3-6 mm. long.....
-74. *C. Careyana*.
- Bract-sheaths not red-tinged, base of culms rarely so; staminate scales tinged greenish white to dull reddish brown.
- Perigynia sharply triangular, short-tapering at the base, closely 35-50-nerved.
- Spikes erect, nearly sessile; leaf blades very smooth except for the margins, the larger 12-25 mm wide, those of the fertile culms much smaller than those of the sterile.....75. *C. platyphylla*.
- Spikes drooping on filiform peduncles; leaf blades hispidulous on the veins, 2-12 mm wide, those of the fertile culms moderately smaller than those of the sterile.
- Staminate spike sessile or subsessile, inconspicuous; pistillate spikes approximate; lowest bract subspathaceous, exceeding the inflorescence.....
-76. *C. abscondita*.
- Staminate spike peduncled, conspicuous; pistillate spikes scattered; lowest bract not at all spathaceous, not exceeding the inflorescence.
- Pistillate spikes without a staminate flower at the base; leaf blades 2-5 mm wide, erect, green.....77. *C. digitalis*.
- Pistillate spikes with 1-2 staminate flowers at the base; leaf blades 5-12 mm wide, weak, glaucous green.
- Angles of the culms blunt, minutely serrulate only below the bracts; edges of the bract-sheaths entire; perigynia tapering at the apex, short-beaked.....78. *C. laxiculmis*.
- Angles of the culms sharp, minutely serrulate; edges of the bract-sheaths minutely serrulate; perigynia rounded or round-tapering at the apex, blunt or abruptly very short-beaked...78a. *C. laxiculmis* var. *copulata*.
- Perigynia obtusely triangular (at least below), long-tapering at the base.
- Bract-sheaths smooth on the edges or shallowly serrulate; beak of perigynium straight or slightly oblique.

* This color is often called "purple" in *Carex* descriptions. It is a close match with Ridgway's "Bordeaux" which is 90% red and 10% violet.

- Sterile shoots developing conspicuous culms; leaves not semi-evergreen; perigynia rather sharply angled above; pistillate spikes few-flowered, the lower on long capillary peduncles.....79. *C. styloflexa*.
- Sterile shoots reduced to tufts of leaves; leaves semi-evergreen; perigynia obtusely triangular.....80. *C. laxiflora*.
- Bract-sheaths strongly serrulate on the edges.
- Sterile shoots reduced to tufts of leaves, not forming culms.
- Pistillate scales acuminate to strongly cuspidate, more than half the length of the perigynia; beak of perigynium conspicuous, straight or oblique; leaves semi-evergreen; staminate spike peduncled, conspicuous.....80a. *C. laxiflora* var. *serrulata*.
- Pistillate scales broadly obovate-orbicular, half the length of the perigynia or less, strongly divergent at the base; beak of perigynium short, abruptly bent; leaves not semi-evergreen, the blades 7-30 mm wide; staminate spike sessile, very slender, inconspicuous.....81. *C. albursina*.
- Sterile shoots developing conspicuous culms; leaf blades 3-12 mm wide, not semi-evergreen; pistillate scales mucronate to long-awned; beak of perigynium short, abruptly bent.
- Culms not reddish-tinged at the base; lower pistillate spikes not on long capillary peduncles; staminate scales usually greenish white or slightly tinged with reddish brown; staminate spike typically sessile or very short-peduncled; perigynia obovoid, 3-4 mm long.....82. *C. blanda*.
- Culms reddish-tinged at the base; lower pistillate spikes on long capillary peduncles; staminate scales strongly tinged with reddish brown; staminate spike long-peduncled; perigynia broadly obovoid, 2.5-3.2 mm long.....83. *C. gracilescens*.

73. **Carex plantaginæa** Lam. Map 496. Rather infrequent in the northern counties in rich woods. South of the lake area it is local and found mostly in humus on the wooded sandstone slopes of deep ravines, usually in dense shade and associated with *Hydrophyllum appendiculatum*. No specimen was found to confirm the report in Coulter's Catalogue from Tippecanoe County.

Que. to Sask., southw. to N. C. and Ky.

74. **Carex Careyana** Torr. Map 497. Frequent but local in moist rich woods, particularly in ravines.

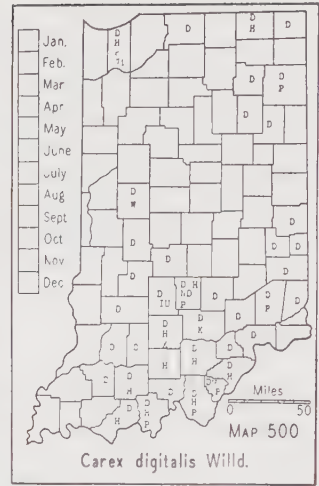
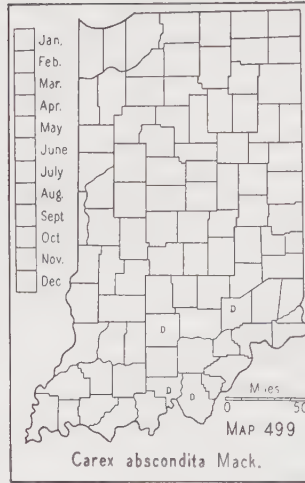
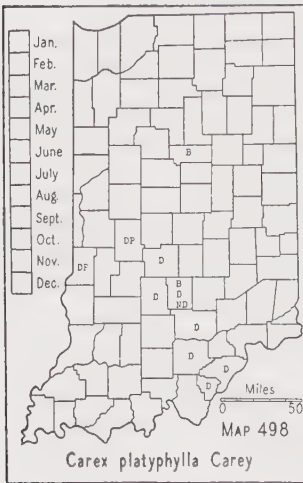
N. Y. to Mich., southw. to Va. and Mo.

75. **Carex platyphýlla** Carey. Map 498. All the Indiana collections of this species are from the knob area (Chestnut Oak Upland) with the exception of a single collection from Vigo County and one from Putnam County. It is found in calcareous soils on dry open woodland slopes. No specimen could be found to confirm Bradner's report from Steuben County, but the occurrence of the species in the northern counties is not improbable since it is known from southern Michigan.

Que. to Mich., southw. to N. C. and Ill.

76. **Carex abscóndita** Mack. (*Carex ptychocarpa* Steud.) Map 499. A southern and Coastal Plain species found in Indiana in the southern counties only. It is rare in dry beech woods and very rare in black-white oak woods.

Mass. to Ind., southw. to Fla. and La.



77. *Carex digitalis* Willd. (Including *Carex digitalis* var. *macropoda* Fern. Rhodora 40: 400-401. 1938.) Map 500. Common in southern Indiana; locally frequent in the northern counties. A woodland species preferring dry beech woods but frequent also in dry or moist black or white oak woods.

The length of the peduncle of the staminate spike in this species, as in *Carex laxiculmis*, is extremely variable. An extreme form in which the staminate spike is born on a peduncle overtopping the uppermost pistillate spike and bract has been described by Professor Fernald as var. *macropoda*, and under this variety he cites Deam no. 27837 from Crawford County and no. 27119 from Perry County. In the Deam Herbarium, Deam no. 44066 from Perry County apparently represents this extreme of the species but is too immature to be placed here with certainty. Among the numerous intermediate collections Deam no. 20378 from Harrison County and no. 20592 from Washington County most nearly approximate var. *macropoda*.

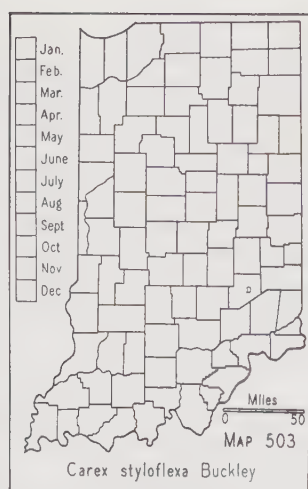
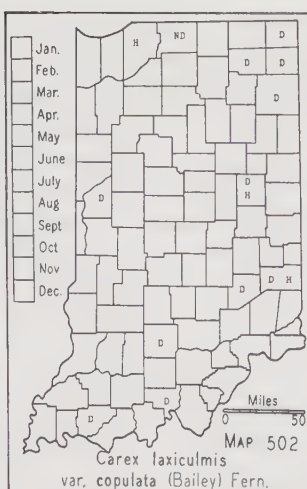
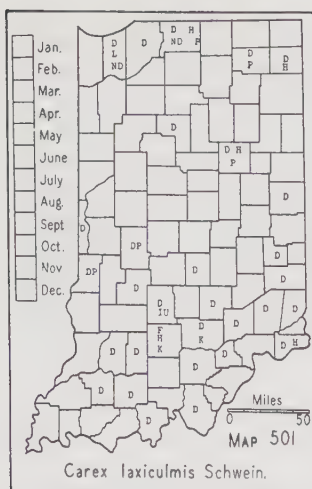
78. *Carex laxiculmis* Schwein. Map 501. Fairly common in woods and thickets. Plants intermediate between the species and the following variety are not infrequent; such are Deam nos. 844; 24750; 35708; 35924; 36407; 40669; and 51825.

Maine to Wis., southw. to N. C. and Mo.

78a. *Carex laxiculmis* var. *copulata* (Bailey) Fern. (*Carex copulata* (Bailey) Mack.) Map 502. Frequent in eastern Indiana in dry woods, principally white oak and beech; rare in the western counties. The variety is said to be a calciphile while the species prefers neutral or only slightly calcareous soils.

N. J. to Mich. and Mo.

79. *Carex styloflexa* Buckley. (*Carex laxiflora* var. *styloflexa* (Buckley) Boott.) Map 503. An eastern and southern species chiefly of the Coastal Plain known in Indiana from a collection by Mrs. C. C. Deam: in moist woods near Adams, Decatur County, May 13, 1911, no. 8149.



Conn. to Fla. and Tex., mostly along the coast, northw. in the Mississippi Valley to s. Ind.

80. *Carex laxiflora* Lam. (*Carex heterosperma* Wahl., *Carex anceps* Muhl. and *Carex laxiflora* var. *patulifolia* (Dewey) Carey.) (Including *Carex striatula* Michx., *Carex laxiflora* var. *striatula* (Michx.) Carey, and "*Carex laxiflora*" Mack., not Lam., in Small, Manual of the Southeastern Flora.) Map 504. Common in dry woods, especially beech-sugar maple, throughout the state.

The form commonly referred to *Carex striatula* Michx. may deserve varietal recognition, at least in the southern part of its range and on the Coastal Plain where it attains the extreme of its differentiation, but in Indiana intermediates so far outnumber the extremes that all attempts to separate it even varietally have been unsuccessful.

N. S. to Mich., southw. to Fla. and Tex.

80a. *Carex laxiflora* var. *serrulata* Hermann. (*Rhodora* 40: 80. 1938.) Map 505. Known from four counties all in the eastern half of the state. Its habitat is that of the species. The type collection (Deam no. 6458) came from a wooded ravine two miles northwest of Henryville, Clark County, May 25, 1910.

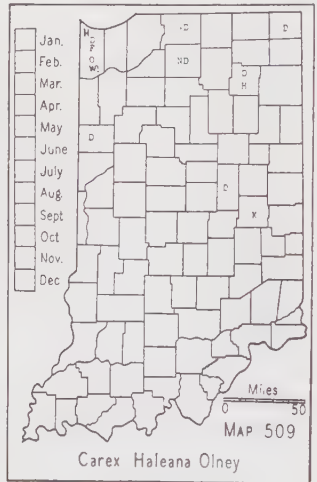
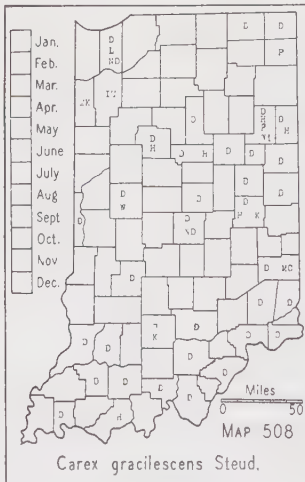
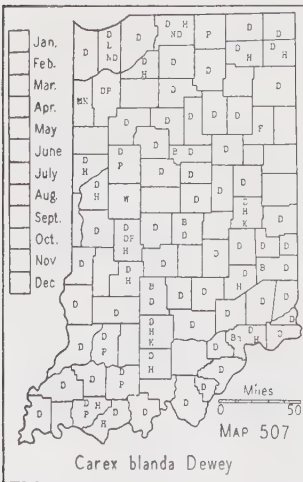
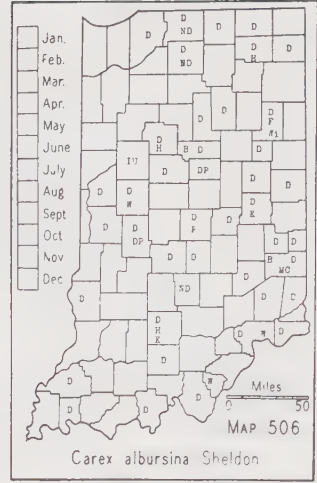
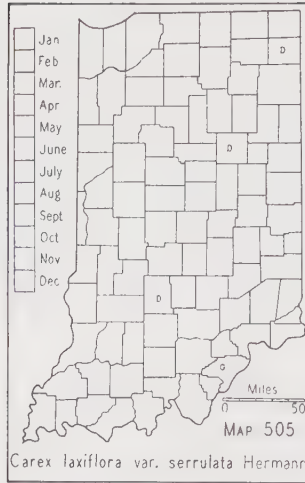
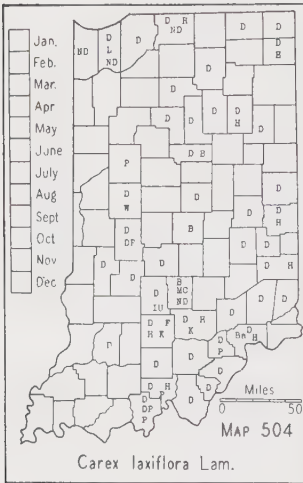
Pa. and Ind.

81. *Carex albursina* Sheldon. (*Carex laxiflora* var. *latifolia* Boott.) Map 506. Common on wooded slopes, chiefly in limestone areas; rare in low, moist or alluvial woods.

Deam's collection of May 7, 1905, from Blackford County is exceptional in having the leaves semi-evergreen and rather rigid.

Que. to Minn., southw. to Va. and Ark.

82. *Carex blanda* Dewey. (*Carex laxiflora* var. *varians* of authors, not Bailey.) Map 507. Very common throughout the state, doubtless occurring in every county. In woods of all types it is the commonest species of this section of the genus. The other Indiana species of the *C. laxiflora* group



are rarely found in either very sandy or (except *C. gracilescens*) very moist woods as *C. blanda* frequently is.

Que. to N. Dak. southw. to Ala. and Tex.

83. ***Carex gracilescens* Steud.** ("*Carex laxiflora*" Mack., not Lam., in Britton and Brown, Illus. Flora, ed. 2 and *Carex laxiflora* var. *gracillima* of Gray, Man., ed. 7.) Map 508. Common in low woods and on wooded slopes. It is generally less plentiful where found than is *C. blanda* at its stations.

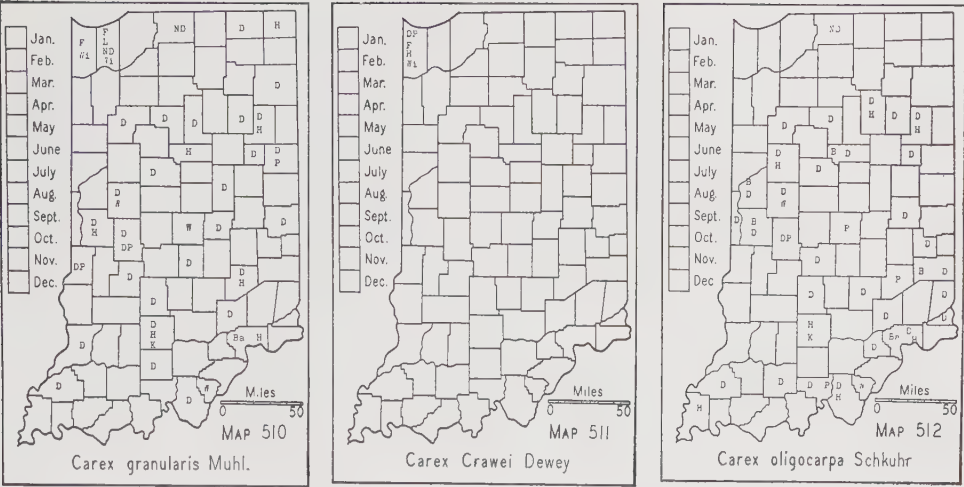
Que. to Wis., southw. to Va. and Ark.

22. § GRANULARES

Staminate spike short-peduncled or sessile; the two upper pistillate spikes usually contiguous; rootstocks not long-creeping.

Perigynia elliptic-obovoid to elliptic-ovoid, 2-2.5 mm long, 1-1.5 mm wide, ascending, not ventricose-squarrose, rounded at the apex, abruptly very minutely beaked...

.....84. *C. Haleana*.



Perigynia broadly ovoid to broadly obovoid, 2.5-4 mm long, 1.5-2.5 mm wide, soon ventricose-squarrose, tapering at the apex, minutely beaked...85. *C. granularis*. Staminate spike long-peduncled; spikes all widely separate; rootstocks long-creeping...86. *C. Crawei*.

84. *Carex Haleana* Olney. (*Carex granularis* var. *Haleana* (Olney) Porter and *Carex Shriveri* Britt.) Map 509. Infrequent in low ground, principally along creeks; occasionally on calcareous sandy shores. More frequent northward, and not known from the unglaciated area. Que. to Sask., southw. to Va., Ind., and Kans.

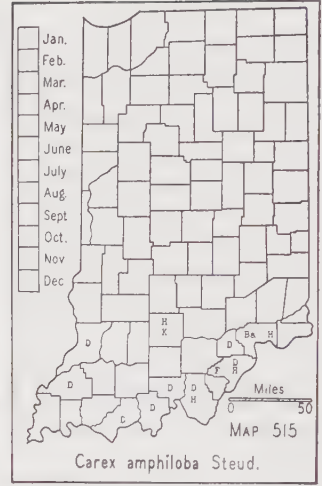
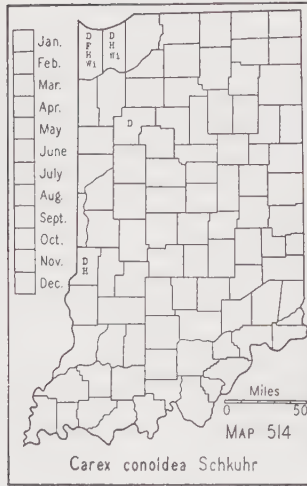
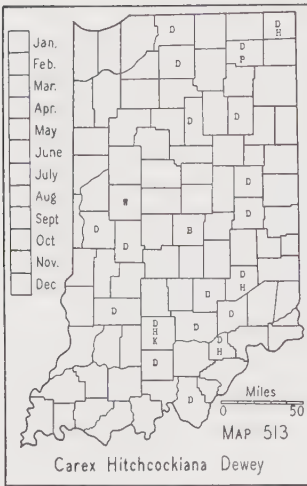
85. *Carex granularis* Muhl. Map 510. Common throughout the state in moist openings, low woods and on banks of creeks, especially in clay soils; frequent in dry open woods. Vt. to Minn., southw. to Fla. and Ark.

86. *Carex Crawei* Dewey. Map 511. Known in Indiana from Lake County only where it is locally plentiful on moist sandy interdunal flats. Here it is commonly associated with *Carex Garberi*, *C. aurea*, *C. Meadii*, and often with *C. viridula*. Que. to Alberta and Wash., southw. to ne. N. J., s. Ala., Tenn., Kans., and Wyo.

23. § OLIGOCÁRPAE

Bract-sheaths glabrous, the lower 0.6-2 cm long; perigynia 4 mm or less long; leaf blades 2-4.5 mm wide; culms reddish-tinged at the base.....87. *C. oligocarpa*. Bract-sheaths strongly hispidulous, the lower 2-6 cm long; perigynia 4.5-5 mm long; leaf blades 3-7 mm wide; culms brownish-tinged at the base..88. *C. Hitchcockiana*.

87. *Carex oligocarpa* Schkuhr. Map 512. Common in rich woods except in the three northern tiers of counties where it is rare. It is a plant of calcareous soils and its favorite habitats are moist, wooded ravines and beech or beech-maple slopes. Occasionally it occurs on dry slopes and in open woods. Vt. and Ont. to Iowa, southw. to Ala., Ky., and Tex.



88. *Carex Hitchcockiana* Dewey. Map 513. In calcareous or neutral soils; common in rich woods and moist ravines and on river banks; rarely in dry, sandy woods. It is often associated with *Carex Jamesii*, *C. oligocarpa*, *C. blanda*, and *C. gracillima*.

Vt. and Ont. to Wis., southw. to W. Va., Ky., and Mo.

24. § GRÍSEAE

Perigynia elliptic, 1.5 mm wide; bract-sheaths minutely serrulate on the edges; peduncles of pistillate spikes rough; leaf blades 2-4 mm wide.....89. *C. conoidea*.

Perigynia oblong-oval to broadly obovoid, 2- (occasionally 1.5 in *C. amphibola*) 2.5 mm wide; bract-sheaths glabrous; peduncles of pistillate spikes glabrous or nearly so; leaf blades 2-18 mm wide.

Pistillate spikes 3-12 flowered; leaves slightly if at all glaucous, thin and soft; bract-sheaths tight.

Pistillate spikes widely separated, the lower nearly basal; culms strongly reddish-tinged at the base; perigynia scarcely turgid; leaf blades 2-4 mm wide, erect; achenes slenderly stipitate.....90. *C. amphibola*.

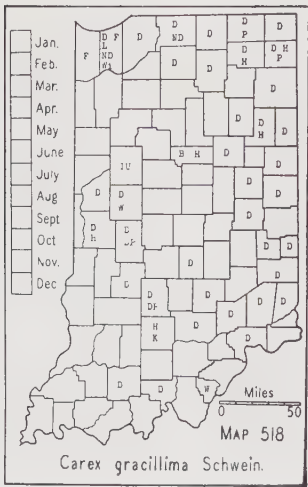
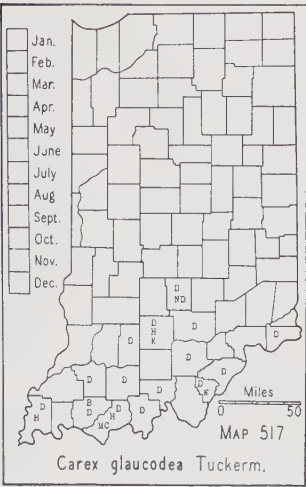
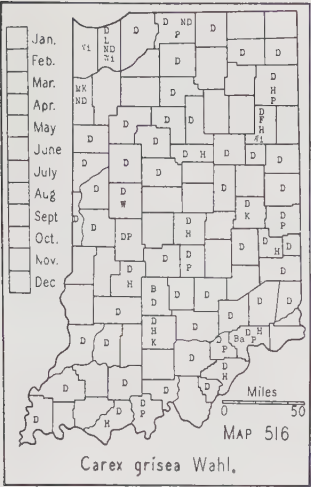
Lower pistillate spikes not nearly basal; culms brownish-tinged at the base; perigynia more or less turgid; leaf blades (2) 4-7 mm wide, ascending; achenes substipitate.....91. *C. grisea*.

Pistillate spikes (12) 15-35-flowered; leaves very glaucous, thick and firm; bract-sheaths enlarged upward.....92. *C. glaucoidea*.

89. *Carex conoidea* Schkuhr. Map 514. Infrequent in the northwestern counties in wet sandy fields and on banks of ditches. It is always a very local species and this may account for the lack of specimens or reports from northeastern Indiana where it should be found. The reports from Putnam County by Coulter, from Clark County by Baird & Taylor, and from the Lower Wabash Valley by Schneck are unsupported by specimens.

Newf. to Minn., southw. to Del., Ohio, and Iowa; also in the mts. of N. C.

90. *Carex amphibola* Steud. (*Carex grisea* var. *angustifolia* Boott.) Map 515. Frequent in southern Indiana especially in the unglaciated area,



in dry beech, beech-maple, and white oak woods. Reported from Putnam and Hamilton Counties by Wilson but no specimens could be found to authenticate these reports.

N. J. to Ind., southw. to Fla. and Tex.

91. *Carex grisea* Wahl. Map 516. Very common throughout the state in rich dry or moist woods and thickets, in ditches, on banks of streams, and along roadsides. It is extremely variable in its vegetative characteristics and in the shape and size of its perigynia.

N. B. to Ont. and Minn., southw. to Ga. and Tex.

92. *Carex glaucodea* Tuckerm. Map 517. Frequent in southern Indiana on wooded or open hillsides in either dry or moist soils. It is partial to slopes and ridges and its most frequent habitats are abandoned roads in woods and paths on open grassy hills. No specimens could be located to authenticate the reports from Lake County by Coulter and by Peattie. All the known Indiana collections have come from within or very near the unglaciated area.

Mass. to Ont. and Ill., southw. to N. C. and Ark.

25. § GRACÍLLIMAE

Sheaths (except the lower which are dorsally somewhat hispidulous) and leaves glabrous; perigynia less than 2 mm thick.

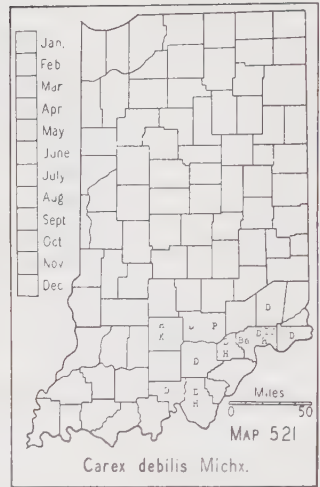
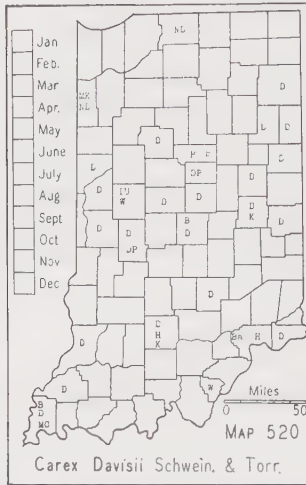
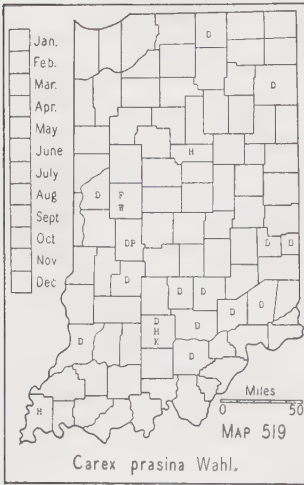
Bracts long-sheathing; perigynia bluntly angled, obtuse at the apex.....93. *C. gracillima*.

Bracts sheathless; perigynia sharply angled, tapering into a triangular, often twisted, beak nearly as long as the body.....94. *C. prasina*.

Sheaths and often leaf blades pubescent; perigynia 2-2.5 mm thick.....95. *C. Davisii*.

93. *Carex gracillima* Schwein. Map 518. Doubtless found in every county in the state. It is common in wooded ravines and in low woods of all types, although it shows a preference for open beech or beech-maple woods.

Newf. to Man., southw. to Va., Ky., and Mo.



94. *Carex prasina* Wahl. Map 519. Infrequent, becoming frequent in the southeastern counties. A species of very wet or springy habitats in deep woods, growing generally along streamlets and frequently on bars and rocks in streams.

Que. to Mich., southw. to D. C. and Ky., and in the Alleghenies to Ga.

95. *Carex Davisii* Schwein. & Torr. Map 520. Frequent in neutral or calcareous soils in low, especially alluvial, beech and beech-maple woods and in moist roadside ditches. It sometimes superficially resembles luxuriant forms of *Carex grisea* from which it may be readily distinguished by the terminal spike which is gynaeandrous in *C. Davisii* and staminate in *C. grisea*.

Vt. to Minn., southw. to Md., Tenn., and Tex.

26. § SYLVATICAE

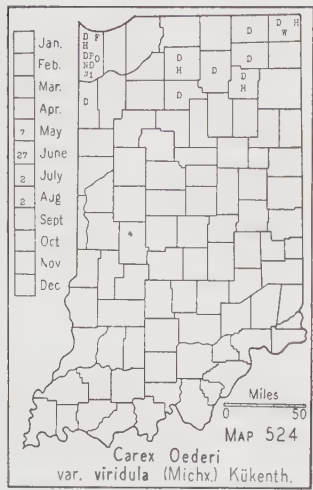
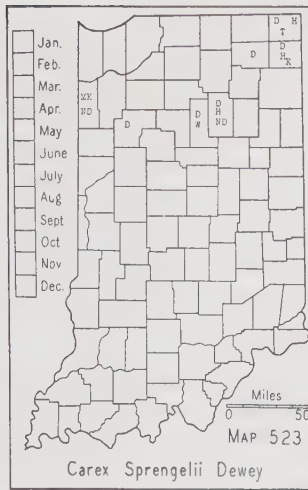
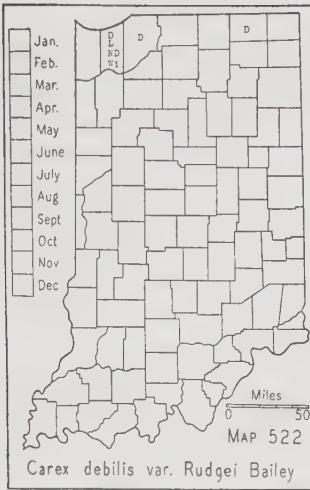
Perigynia sessile or substipitate; scales obtuse to short acuminate, usually half the length of the perigynia or less; achenes conspicuously stipitate; broadest basal leaves 2-4.5 mm wide.

Perigynia 6-10 mm long, narrowly lanceolate, broadest below the middle, very gradually tapering toward the apex or the broad portion elongate; pistillate scales mostly rounded on the back, rarely tinged with reddish brown....96. *C. debilis*.

Perigynia 4.5-7 mm long, broadly ovate-lanceolate, broadest at the middle, abruptly tapering at both ends, the broad portion short; pistillate scales mostly keeled and tinged with reddish brown.....96a. *C. debilis* var. *Rudgei*.

Perigynia strongly stipitate; scales strongly cuspidate or awned, usually more than half the length of the perigynia; achenes substipitate or sessile; broadest basal leaves 5-10 mm wide. (See excluded species no. 21, p. 275.).....*C. arctata*.

96. *Carex debilis* Michx. Map 521. Infrequent in southern Indiana, principally in the southeastern counties, where it is found in low wet woods, especially flat or even swampy pin oak and beech-sweet gum woods.



It is not known in Indiana from the habitat ascribed to it by Mackenzie ("dry woods and copses," *N. Amer. Flora* 18: 290. 1935).

Mass. and s. Ind., southw. to Fla. and Tex.

96a. *Carex debilis* var. *Rudgei* Bailey. (*Carex flexuosa* Muhl., *Carex tenuis* Rudge, and *Carex debilis* var. *strictior* Bailey.) Map 522. Infrequent near the northern border of Indiana where it is found in low beech-maple woods. Any specimens which may have formed the basis for the report of this variety (as *C. tenuis*) from Jefferson County in Coulter's Catalogue doubtless should be referred to *C. debilis*.

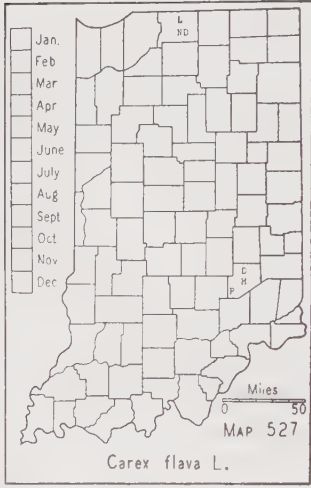
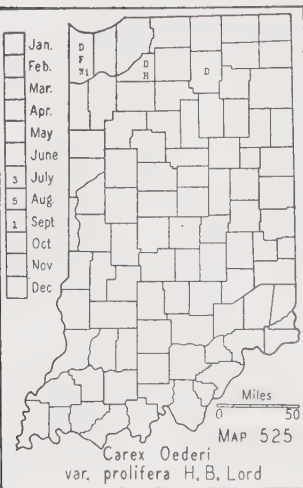
Although *Carex debilis* and its variety *Rudgei* are geographically widely separated in Indiana their ranges overlap farther east.

Newf. to Wis., southw. to Va. and Mo.; also in the mts. of N. C. and Tenn.

27. § LONGIROSTRES

97. *Carex Sprengelii* Dewey. (*Carex longirostris* Torr.) Map 523. A local species known in the state only from the lake area. The Miami and Noble County stations are in bluegrass sod along roadsides; that of De Kalb County, on a wooded flood plain with beech and black maple; that of Steuben County, a low depression in woods; the Wabash County, the side of "Hanging Rock" on the south bank of the Wabash River, southeast of Lagro; the White County, a moist wooded bottom along the Tippecanoe River, northeast of Buffalo. Its usual habitats, outside Indiana, are rich rocky woods especially in moist depressions, and on crests of calcareous river bluffs or the tops of limestone boulders in open woods. It is often in large colonies where found.

N. B. to Alberta, southw. to Del., Pa., Nebr., and Colo.



28. § EXTÉNSAE

Perigynia 2-3 mm long, little if at all deflexed, the beak much shorter than the body; spikes oblong, 4-7 mm wide.

Spikes 2-7, the lower often separate, the terminal usually staminate, conspicuous; pistillate scales usually reddish-tinged. 98. *C. viridula*.

Spikes 4-15, mostly densely aggregated, the terminal usually androgynous with the staminate portion very small and inconspicuous; pistillate scales usually very slightly if at all reddish-tinged. 98a. *Carex viridula* f. *intermedia*.

Perigynia 3.5-6 mm long, at least the lower conspicuously deflexed, the beak equaling the body; spikes subglobose, 7-12 mm wide.

Perigynia 3.5-4.5 mm long, the beak smooth, pale at the tip; scales slightly if at all reddish-tinged, largely concealed by the perigynia; leaf blades 1-3 mm wide. 99. *C. cryptolepis*.

Perigynia 4.5-6 mm long, the beak serrulate, reddish-tinged at the tip; scales strongly reddish-tinged, conspicuous in the spikes; leaf blades 3-5 mm wide. 100. *C. flava*.

98. *Carex viridula* Michx. (See, Jour. Bot. 77: 301-304. Nov. 1939.) (*Carex Oederi* var. *viridula*, *Carex Oederi* var. *pumila* (Coss. & Germ.) Fern., and *Carex irregularis* Schwein.) Map 524. Frequent on marly and sandy lake borders, and in swales among the dunes.

Newf. to Alaska, southw. to N. J., Ind., N. Mex., Utah, and Calif.

98a. *Carex viridula* f. *intermedia* (Dudley) Hermann, comb. nov. (*Carex Oederi* f. *intermedia* Dudley, Bull. Cornell Univ. 2:117. 1886.) (*Carex chlorophila* Mack.* and *Carex Oederi* var. *prolifera* H. B. Lord.) Map 525. Infrequent in the habitats of the preceding variety.

*Of the characters employed by Mackenzie to distinguish his *C. chlorophila* from *C. viridula* very few seem to hold with any degree of constancy. A careful study of an extensive series of both plants has shown the characteristics ascribed to the leaf blades and sheaths to be wholly unreliable. The characters used in the above key to separate *C. chlorophila* from *C. viridula* (the former here considered as a form of *C. viridula*), although often well-marked, are tendencies only and they, together with a generally later flowering and fruiting date (contrary to Mackenzie's note in N. Amer. Flora 18: 303 that *C. Oederi*, *C. viridula*, and *C. chlorophila* "bloom and bear fruit from early summer until frost"), do not seem sufficiently constant to maintain *C. chlorophila* as a species. Umbach's collections of June 4 and 24, 1899, and Deam nos. 44412 (June 3, 1927) and 42172 (Aug. 19, 1925) are intermediate in nearly all characters, but on the basis of the early fruiting date of the first three they may be referred to *C. viridula* while the late date of the last would place it nearer f. *intermedia*.

Between *C. viridula* and *f. intermedia* there is a more or less well-defined seasonal difference in flowering and maturing of the fruit as may be seen from the collection dates with Maps 524 and 525. In Indiana *C. viridula* is in its prime in June; *f. intermedia* in August.

N. Y. to Wis., southw. to N. J. and Ind.

99. *Carex cryptólepis* Mack. (*Carex flava* var. *rectirostra* Gaudin, in part.) Map 526. Frequent in northern Indiana on marly lake borders and in marshes rich in marl; infrequent on wet sandy lake shores.

Newf. to Minn., southw. to N. J. and Ind.

100. *Carex fláva* L. Map 527. A widespread species which is common throughout most of its range but rare and very local in Indiana. The two known localities for it in the state are: marly marsh on the Wolverton Estate, 7 miles southwest of South Bend, St. Joseph County, Deam nos. 54874 and 55079; and springy wooded bank of Flat Rock River, three-fourths of a mile above St. Paul, Decatur County, Mrs. C. C. Deam nos. 10766 and 13400.

Newf. to B. C., southw. to N. J., Ind., and Mont.; also in Europe.

29. § VIRESCÉNTES

Perigynia densely pubescent; spikes about 3-4 mm thick, the lower more or less widely separated and peduncled; ligule much longer than wide.

Pistillate spikes oblong or oblong-globose, abrupt or rounded at the base, the lowest 5-20 mm long; perigynia broadly obovoid; anthers 0.8-1.6 mm long; leaves usually exceeding the culms.....101. *C. Swanii*.

Pistillate spikes linear, attenuate at the base, the lowest 15-40 mm long; perigynia oblong-elliptic or narrowly obovoid; anthers 1.5-2.5 mm long; leaves usually shorter than the culms.....102. *C. virescens*.

Perigynia glabrous; spikes 4-8 mm thick, contiguous or nearly so, sessile or subsessile; ligule not longer than wide.

Perigynia strongly flattened ventrally, rounded at the apex, nerved, achenes with a somewhat bent short-apiculate tip.....103. *C. hirsutella*.

Perigynia turgid, nearly round in cross section, short-pointed at the apex, coarsely nerved or ribbed; achenes with a very abruptly bent apiculate tip or style.

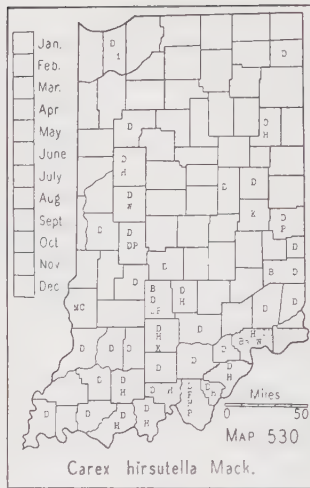
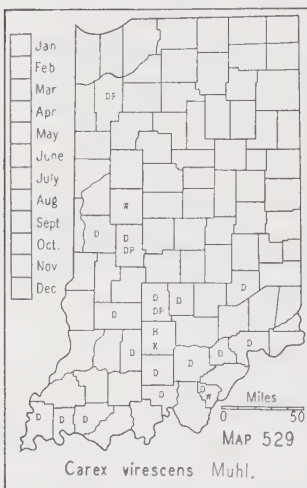
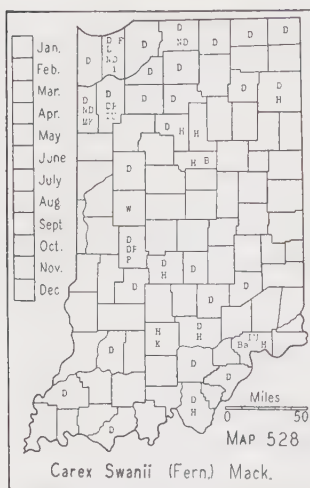
Leaf blades glabrate; perigynia 2 mm long; pistillate scales not pilose, obtuse or short-cuspidate.....104. *C. caroliniana*.

Leaf blades pubescent, especially below; perigynia 2.5-3.5 mm long; pistillate scales sparingly pilose, long-acuminate, cuspidate or awned.....105. *C. Bushii*.

101. *Carex Swánii* (Fern.) Mack. (*Carex virescens* var. *Swanii* Fern.) Map 528. Common in clearings in low woods, and in moist open oak woods; infrequent along roadsides, on flood plains, and on wooded slopes. N. S. to Wis., southw. to N. C., Tenn., and Ark.

102. *Carex viréscens* Muhl. Map 529. Fairly common in the southern counties, especially in the knob area (Chestnut Oak Upland), on wooded bluffs, slopes, and river banks; infrequent in level woods. It is known from the lake area from a single collection and most reports from the northern third of the state were doubtless based upon material of *C. Swanii*.

Maine to Ind., southw. to Ga. and Tenn.



103. **Carex hirsutella** Mack. (*Carex triceps* var. *hirsuta* (Willd.) Bailey; "*Carex complanata*" Mack., not Torr., in Britton and Brown, Illus. Flora, ed. 2.) Map 530. Common in southern Indiana, usually in sterile soil, in dry open woods and fallow fields and along sandy roadsides; infrequent in low or flat woods; becoming less frequent northward and rare in the northernmost counties.

Maine to Mich., southw. to Ala. and Tex.

104. **Carex caroliniana** Schwein. (*Carex triceps* var. *Smithii* Porter.) Map 531. Frequent in southern Indiana in low flat woods and in clay soil in fallow fields.

N. J. to N. C. and Tex.

105. **Carex Búshii** Mack. (Bull. Torrey Bot. Club 37: 241. 1910.) Map 532. Known in Indiana only from three stations, found by Deam, all in the unglaciated area. It is common in the Posey County locality in low, open post oak flats south of Half Moon Pond, 9 miles southwest of Mount Vernon. The two localities in Spencer County are in a low fallow field one mile north of Bloomfield (4 miles northwest of Chrisney), and in a low, open pin oak and post oak flat two miles southeast of Dale.

Mackenzie has pointed out the marked general resemblance of this species to the wholly unrelated *Carex Buxbaumii*.

Mass. to Mich., southw. to D. C., Miss., and Tex.

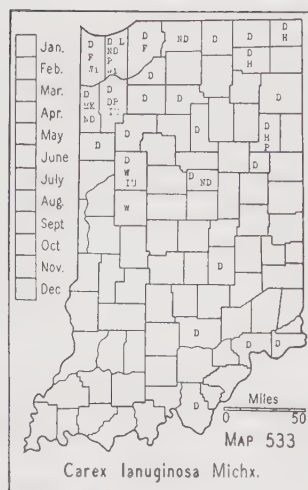
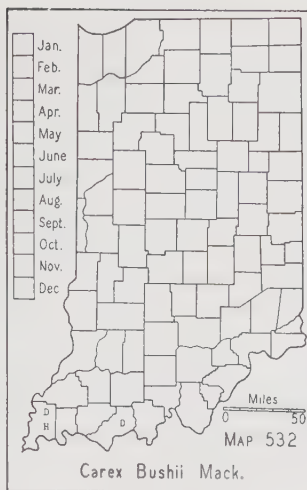
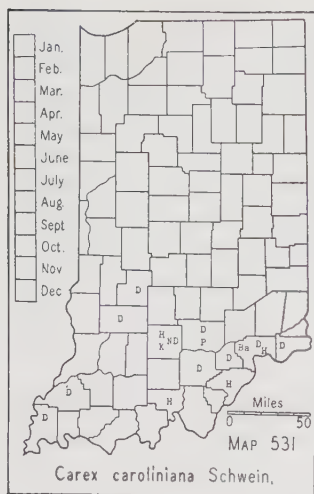
30. § HÍRTAE

Leaf blades flat, 2-5 mm wide; culms sharply triangular; achenes straight-apiculate.

.....106. *C. lanuginosa*.

Leaf blades involute-filiform, 2 mm wide or less; culms obtusely triangular; achenes bent-apiculate.....107. *C. lasiocarpa*.

106. **Carex lanuginosa** Michx. Map 533. Common in northern Indiana in swamps, sloughs, wet ditches, open swampy woods, and on lake borders; infrequent in southern Indiana. This, like the following species, is usually plentiful where found, often being the dominant plant in a marsh or on a



lake border. It is one of the most widely distributed sedges in North America.

Schneck's report from the Lower Wabash Valley is unsupported by specimens; in fact, no material has been seen from any of the southwestern counties.

N. B. to B. C., southw. to Tenn., Ark., N. Mex., and Calif.

107. *Carex lasiocarpa* Ehrh. (*Carex filiformis* of authors, not L.) Map 534. Frequent in the lake area in sloughs and sphagnum bogs and on lake borders. Like the preceding species, it often forms large colonies.

No specimen could be found to substantiate Schneck's report from the Lower Wabash Valley, an area far south of the normal range of *C. lasiocarpa*.

Newf. to B. C., southw. to N. J., Pa., Iowa, Idaho, and Wash.; also in Europe.

30A. § ANÓMALAE

Carex scabrata Schwein. (See excluded species no. 23, p. 275.)

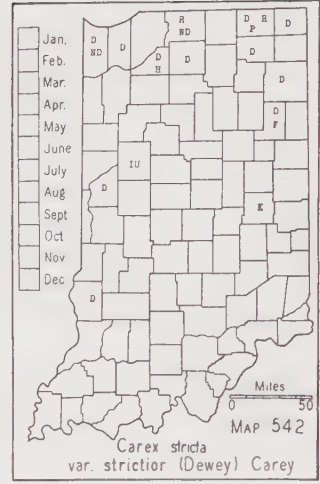
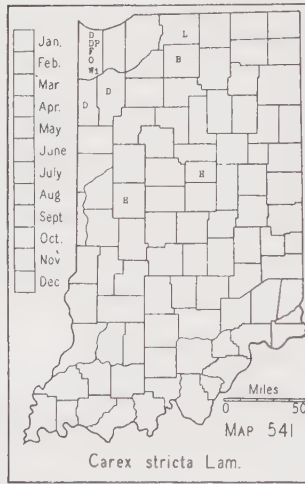
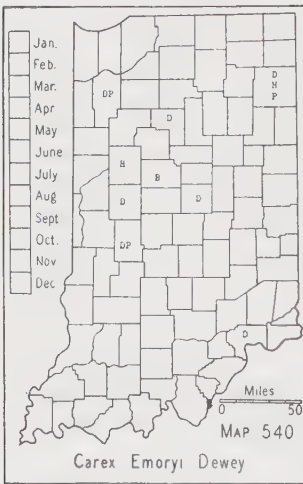
31. § SHORTIÀNAE

108. *Carex Shortiana* Dewey. Map 535. Common except in northern Indiana. It is found in moist open woods and roadside ditches and on banks of creeks.

Attempts to locate a specimen to support Peattie's report from Lake County have been unsuccessful and the species is not otherwise known in western Indiana north of Tippecanoe County.

Pa. to Iowa, south. to Va., Tenn., and Okla.

108a. × *Carex Dèamii* Hermann. (Rhodora 40: 81. 1938.) A sterile hybrid between *Carex Shortiana* and *C. typhina* which was discovered by Deam in Pike County in 1926. The only known locality for it is at the edge of a low woods on the east side of the road dividing sections 17 and 18, Jefferson Twp., two miles southwest of Otwell.



The dominant plant of "sedge meadows" is most frequently this species or var. *strictior*.

Maine to N. C., and along the Coastal Plain to Tex.; also locally in the Great Lakes region.

114a. *Carex stricta* var. *strictior* (Dewey) Carey. (*Carex strictior* Dewey.) Map 542. Common in northern Indiana in marshes and roadside ditches, often in very marly soil; infrequent southward along the western border of the state.

This plant is reputed to grow in beds (not dense tussocks) while *C. stricta* is supposed to occur in very dense tussocks only. Field observations in Indiana, however, do not indicate that this distinction is at all reliable; *C. strictior* has often been seen to form conspicuous tussocks and *C. stricta* was frequently found in beds. The distinctions ascribed by Mackenzie to the foliage characters (leaf blades deep green, channeled and keeled toward the base in *C. stricta*, glaucous to blue-green, flat or nearly so to the base in *C. strictior*) seem to be particularly inconstant. The lowest bract is generally larger and more leaflike in var. *strictior*, but this, too, is merely a tendency. Forms which are transitional in nearly all characters are so frequent in Indiana that it seems best to regard *C. strictior* as not more than a variety.

Que. to Minn., southw. to D. C. (in the mts. to N. C. and Tenn.) and Iowa.

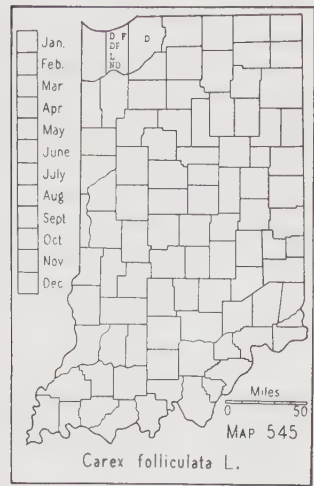
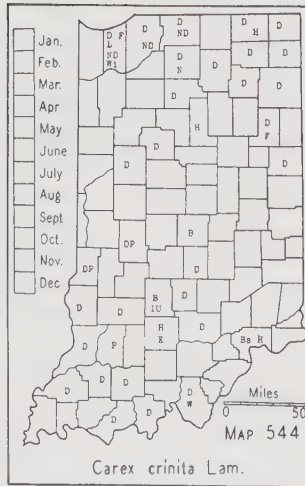
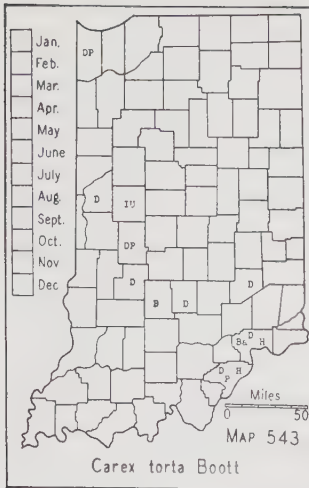
115. *Carex tórta* Boott. Map 543. Frequent south of the lake area on rocky beds of streams, and sand bars in creeks and on their springy banks; rare in woodland swales.

Que. to Minn., southw. to N. C., Tenn., and Ark.

35. § CRYPTOCAËRPAE

116. *Carex crinita* Lam. Map 544. Common in swampy woods and thickets; frequent in swales, sloughs, ditches, and swamps.

Que. to Minn., southw. to N. C. and Tex.



35A. § ORTHOCERÀTES

Carex pauciflora Lightf. (See excluded species no. 28, p. 276.)

36. § FOLLICULÀTAE

117. *Carex folliculata* L. Map 545. Known in Indiana only from the dune area in Porter and La Porte Counties where it is locally frequent on mucky borders of wet woods. One collection of Deam's (4 miles northeast of Michigan City) is from a sedge marsh.

Newf. to Wis., southw. to D. C. (in the mts. to N. C. and Tenn.) and Ind., but best developed on the Coastal Plain.

37. § PSEUDO-CYPÈRI

Teeth of perigynia not over 0.5 mm long; perigynia suborbicular in cross section, inflated, membranaceous, spreading; culms stoloniferous; ligule not longer than wide.....118. *C. hystricina*.

Teeth of perigynia 0.5 mm or more long; perigynia flattened-triangular, scarcely inflated, coriaceous, more or less reflexed; culms not stoloniferous; ligule much longer than wide.

Teeth of perigynia recurved-spreading, 1.2-2 mm long; beaks of perigynia (exclusive of the teeth) 1.5-2.2 mm long, equaling or longer than the bodies; perigynia 6 mm long.....119. *C. comosa*.

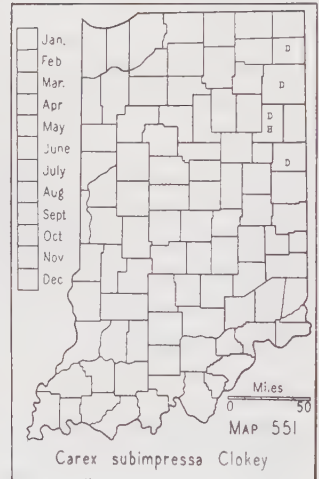
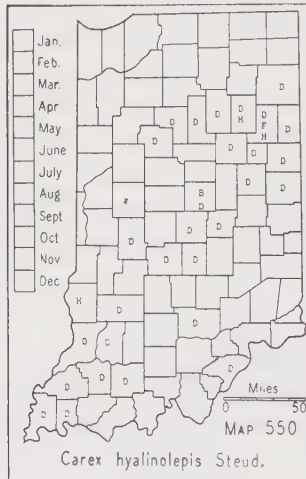
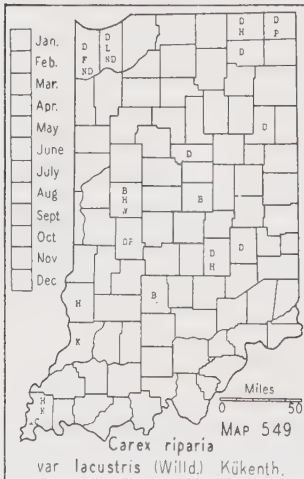
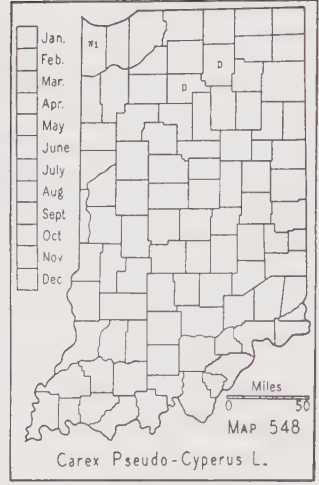
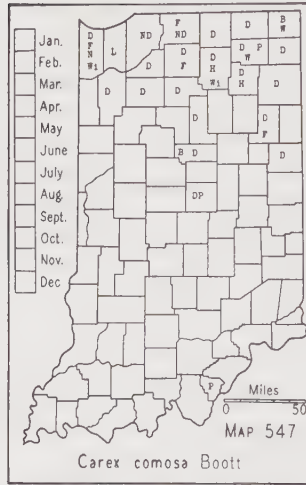
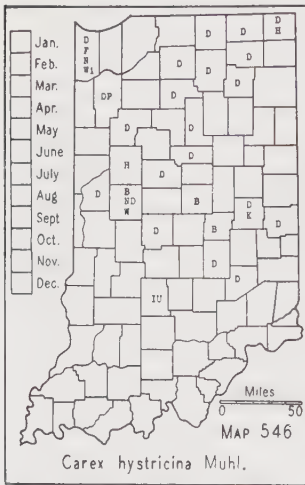
Teeth of perigynia erect or slightly spreading, 0.5-1 mm long; beaks of perigynia (exclusive of the teeth) averaging 1 mm long, shorter than the bodies; perigynia 4-5 mm long.....120. *C. Pseudo-Cyperus*.

118. *Carex hystricina* Muhl. (*Carex hystricina* var. *Dudleyi* Bailey and *Carex hystricina* var. *Cooleyi* Wood.) Map 546. Common in most of the glaciated area of Indiana in swamps and wet habitats of all types but usually in calcareous soils.

No corroborating specimen for Schneck's report from the Lower Wabash Valley could be found.

Que. to Wash., southw. to Va., Ky., Tex., and Calif.

119. *Carex comosa* Boott. (*Carex Pseudo-Cyperus* var. *americana* Hochst.) Map 547. Fairly common in northern Indiana on low borders



of lakes (often in shallow water) and in swamps, sloughs, and ditches. In southern Indiana it is known only from a single collection from Floyd County.

Que. to Minn., southw. to Fla. and La.; also locally in the Pacific Coast States.

120. *Carex Pseudo-Cypèrus* L. Map 548. Rare on lake borders and in sloughs and swamps in northern Indiana where it reaches the southern limit of its range. Like *C. comosa* it frequently grows in shallow water, rooted in muck.

Newf. to Sask., southw. to Conn., N. Y., Ind., and Minn.; also in Eurasia.

38. § PALUDÒSAE

Beaks of perigynia much shorter than the body, the teeth short, about 0.5 mm long, erect or nearly so; foliage glabrous.

Perigynia glabrous.

- Mature perigynia strongly nerved; fertile culms aphyllopodic, strongly reddish-tinged at the base, the lower sheaths filamentose ventrally; ligule at least twice as long as wide.....121. *C. riparia* var. *lacustris*.
- Mature perigynia impressed-nerved; fertile culms phyllopodic, less strongly or not at all reddish-tinged at the base, the lower sheaths not filamentose ventrally; ligule shorter or moderately (less than one and a half times) longer than wide.....122. *C. hyalinolepis*.
- Perigynia hairy, the ribs mostly hidden by the short dense pubescence.....122 a. $\times$ *C. subimpressa*.
- Beaks of perigynia (including teeth) nearly as long as the body; the teeth prominent, 1-3 mm long, erect to widely spreading.
- Perigynia glabrous; leaf sheaths pubescent; at least the lower leaf blades sparsely hairy below toward the base.....123. *C. atherodes*.
- Perigynia hairy; leaf sheaths and blades glabrous.....124. *C. trichocarpa*.

121. *Carex riparia* Curtis var. *lacustris* (Willd.) Kükenth. (*Carex lacustris* Willd.) Map 549. Common in calcareous soils in marshes and ditches and on borders of swamps, lakes, and streams. It often forms extensive stands in marshes. This, and to a lesser extent the following species, seem to be somewhat periodic in fruiting, at least in the Great Lakes States. Often throughout one or more seasons in a large colony, only a few plants, if any, will be found with fertile culms.

Que. to Sask., southw. to Va. and Iowa.

122. *Carex hyalinolepis* Steud. (*Carex riparia* var. *impressa* S. H. Wright and *Carex impressa* (S. H. Wright) Mack.) Map 550. Common, except in the northern three tiers of counties, in roadside ditches and wet depressions in low open woods and on flood plains and borders of ponds.

N. J. to Ont. and Nebr., southw. to Fla. and Tex.

122a. $\times$ *Carex subimpressa* Clokey. (Rhodora 21: 84. 1919; *Carex languinosa* $\times$ *impressa* Clokey, Torreya 16: 199. 1916.) Map 551. Known in Indiana from collections by Deam from four counties along the north-eastern border, where it is very local but usually occurs in colonies which are probably clones. It is found in ditches along roadsides or railroads and in low ground in open woods.

No verifying specimens were found for Clokey's reports from Porter and Posey Counties or for Peattie's report from Lake and Porter Counties. Ind. and Ill.

123. *Carex atherodes* Spreng. (*Carex trichocarpa* var. *imberbis* Gray and *Carex trichocarpa* var. *aristata* (R. Br.) Bailey.) Map 552. Rare in northern Indiana in marshes and wet prairie habitats.

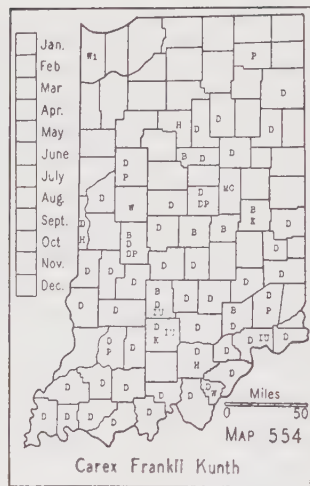
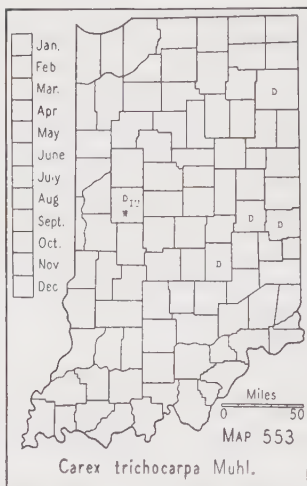
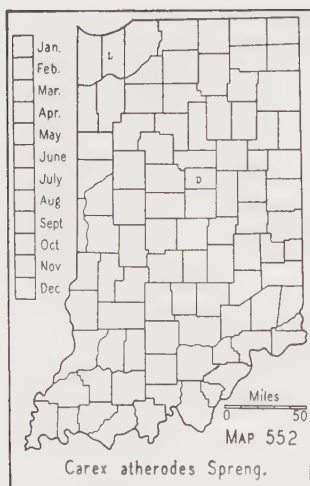
Reported from Marshall County by Clark but no specimens could be located.

Ont. to Yukon, southw. to N. Y., Ind., Mo., Kans., Colo., Utah, and Oreg.; also in Eurasia.

124. *Carex trichocarpa* Muhl. Map 553. Rare in swamps, low openings, and swales in woods; chiefly in eastern-central Indiana.

Reported from Madison County by Smith but no specimens were found.

Que. and Vt. to Minn., southw. to N. J., Ind., and Iowa.



39. § SQUARRÔSAE

Perigynia shorter than the rough-awned scales, 14-20-ribbed; terminal spike usually staminate, narrowly linear, small (0.5-2.5 cm long); ligule slightly, if at all, longer than wide; achenes about 1.5 mm long.....125. *C. Frankii*.

Perigynia much longer than the scales, several-ribbed above; terminal spike gynaeandrous; ligule much longer than wide; achenes 2.2-3 mm long.

Beaks of perigynia mostly appressed-ascending; spikes oblong-cylindric; achenes obovoid, their sides concave; pistillate scales mostly blunt; style straight below.....126. *C. typhina*.

Beaks of perigynia widely radiating; spikes oval or oblong-oval; achenes linear-oval, their sides almost flat; pistillate scales acute to short-awned; style strongly curved or bent below.....127. *C. squarrosa*.

125. *Carex Fránkii* Kunth. (*Carex stenolepis* Torr.) Map 554. Not known from the two northern tiers of counties. Except in the lake and prairie areas very common in ditches and low roadsides and on banks of creeks; frequent in swamps, low flat woods, ravines, marshes, and wet fallow fields.

Pa. and N. Y. to Ill. and Kans., southw. to Ga. and Tex.; also in S. A.

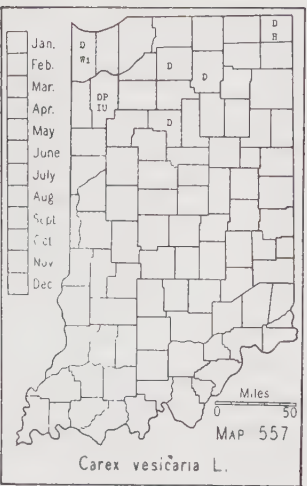
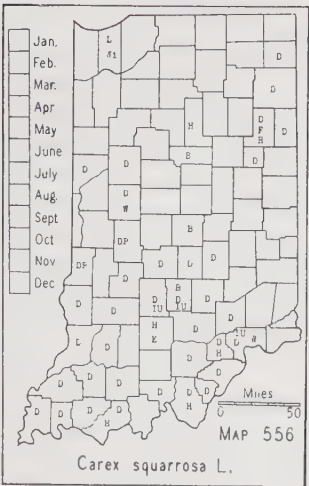
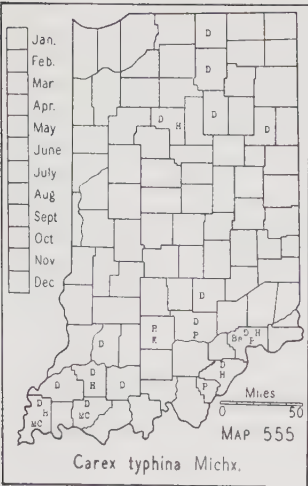
126. *Carex typhina* Michx. (*Carex typhinoides* Schwein.) Map 555. Fairly common in the southern counties, infrequent in northern Indiana, and not known from the central portion of the state. Its favorite habitat is low flat woods, especially pin oak, but it is also found on borders of ponds and in marshes, swamps, and roadside ditches.

Specimens to confirm Wilson's reports from Hamilton and Tippecanoe Counties could not be found.

Que. to Wis. and Iowa, southw. to Ga. and La.

127. *Carex squarrôsa* L. Map 556. Common, especially southward, in low or swampy woods and roadside ditches; frequent on wet borders of ponds and creeks.

Que. to Wis. and Nebr., southw. to N. C. and Ark.



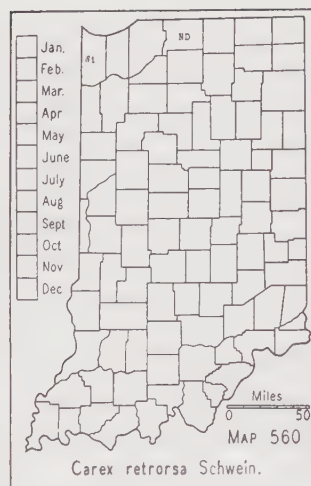
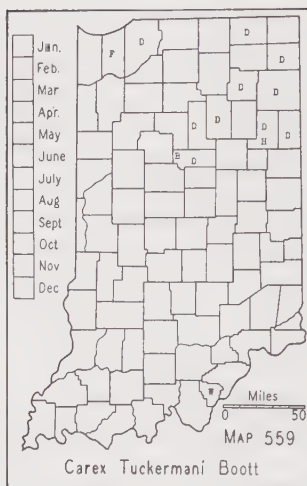
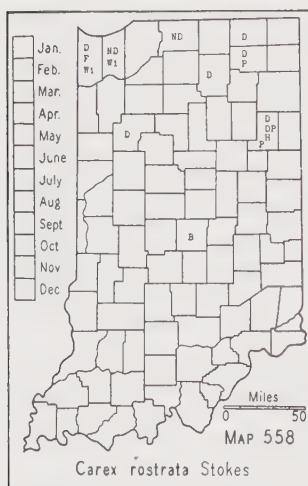
40. § VESICÁRIAE

- Pistillate scales not rough-awned.
- Pistillate spikes oblong to cylindric, 17-many-flowered; leaf blades flat or the margins somewhat revolute.
- Perigynia not reflexed; bracts moderately exceeding the inflorescence.
- Achenes not excavated on one side; perigynia 2.5-3.5 mm wide.
- Culms sharply triangular below the spikes, rough; perigynia appressed or ascending; teeth of perigynia long or perigynia tapering gradually into the beak; lower sheaths fragile, becoming strongly filamentose; ligule much longer than wide; rootstocks short-creeping, without long horizontal stolons.....128. *C. vesicaria*.
- Culms bluntly triangular below the spikes, smooth; perigynia spreading to squarrose at maturity; teeth of perigynia short or perigynia abruptly contracted into the beak; lower sheaths not fragile, not becoming filamentose; ligule slightly if at all longer than wide; rootstocks with long horizontal stolons.....129. *C. rostrata*.
- Achenes deeply excavated on one side; perigynia 5-6.5 mm wide.....130. *C. Tuckermanni*.
- Lower perigynia reflexed or widely spreading, somewhat falcate; bracts many times exceeding the inflorescence.....131. *C. retrorsa*.
- Pistillate spikes globose or short-oblong, 3-18-flowered; leaf blades involute.....132. *C. oligosperma*.
- Pistillate scales rough-awned.....133. *C. lurida*.

128. *Carex vesicaria* L. (Including *Carex vesicaria* var. *monile* (Tuckerm.) Fern.) Map 557. Infrequent in the lake area in swamps, swales, and swampy woods.

Newf. to B. C., southw. to Del., Ind., Mo., N. Mex., and Calif.; also in Eurasia.

129. *Carex rostrata* Stokes. (Including *Carex rostrata* var. *utriculata* (Boott) Bailey.) Map 558. Frequent in northern Indiana in marshes, swamps, low woods, wet roadside ditches, and swales and on borders of ponds and lakes, often in shallow water. It is a very widespread species but generally is not plentiful in any one locality.



Greenland to Alaska, southw. to Del., W. Va., Ind., S. Dak., N. Mex., and Calif.; also in Eurasia.

130. **Carex Tuckermanni** Boott. Map 559. Frequent in northeastern Indiana; otherwise known in the state only from the dune area and from Floyd County. It is found in swales in woods, swamps, and on borders of ponds, frequently in shallow water.

N. B. to Minn., southw. to N. J., Ind., and Iowa.

131. **Carex retrorsa** Schwein. Map 560. Known in Indiana from two collections near the northern border of the state; edge of swamp, East Chicago, Lake County, W. S. Moffatt, July 2, 1893, and, near St. Mary's Academy, Notre Dame, St. Joseph County, J. A. Nieuwland, July 9, 1913.

No corroborating specimens have been seen for the report in Coulter's Catalogue from Gibson County, Wilson's report from Hamilton County or Schneck's from the Lower Wabash Valley.

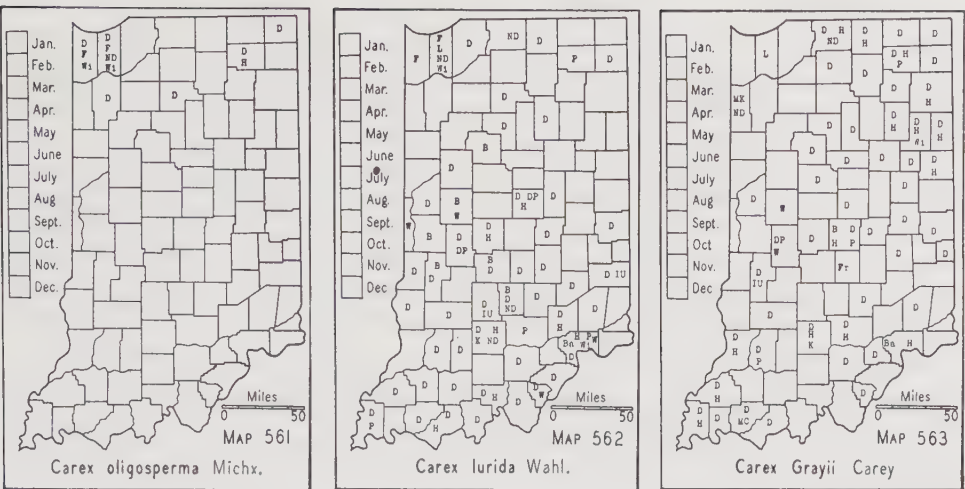
Que. to B. C., southw. to N. J., Ind., Iowa, Colo., and Oreg.

132. **Carex oligosperma** Michx. Map 561. Frequent in the dune area, otherwise quite local in northern Indiana. It prefers *Chamaedaphne* and tamarack bogs, but is found also in marshes and swales and on borders of ponds.

Newf. to Mack., southw. to Mass., Pa., and Ind.

133. **Carex lurida** Wahl. Map 562. Very common; in southern Indiana ubiquitous in swamps, sloughs, ditches, and wet habitats of all types.

Carex lurida is frequently confused with *C. hystericina* and with *C. lupulina*. The following distinctions, in addition to those given in the key to the sections, may be useful in separating it from these. The achene of *C. lurida* is strongly rough-papillate; that of *C. lupulina* is perfectly smooth. Also the teeth of the perigynia in *C. lurida* are very short (averaging 0.5 mm long) and the stigmas all protrude from one side; in *C. lupulina* the teeth are long (0.75-2 mm) and the stigmas radiate irregularly from the orifice. In *C. hystericina* the teeth of the perigynia are longer



and spreading or ascending; in *C. lurida* the teeth are erect or appressed, the perigynia are more abruptly beaked and the beak is longer and narrower.

N. S. to Minn., southw. to Fla., Tex., and Vera Cruz, Mex.

41. § LUPULINAE

Pistillate spikes globose to short-ovoid; style straight or the bend remote from the achene.

Perigynia radiating in all directions, cuneate at the base, subcoriaceous, usually somewhat hispidulous; staminate spike usually sessile or short-peduncled; achenes obscurely trigonous, almost suborbicular in cross section, the angles inconspicuous.....134. *C. Grayii*.

Perigynia ascending, rounded at the base, membranaceous, smooth and shining; staminate spike normally long-peduncled; achenes with blunt angles but conspicuously trigonous.

Perigynia broadly ovoid, about half as broad (5-8 mm) as long.....135. *C. intumescens*.

Perigynia narrowly ovoid, a fourth to a third as broad (3.5-5 mm) as long.....135a. *C. intumescens* var. *Fernaldii*.

Pistillate spikes oblong to cylindric; style abruptly bent immediately above the achene.

Achenes conspicuously longer than wide, the angles not prominently knobbed, the sides shallowly concave; pistillate spikes short-oblong to oblong-cylindric.

Culms arising one to few together from elongate rootstocks; staminate spike narrow, 2.5 mm wide, very long-peduncled; pistillate scales blunt to acute, rarely short-mucronate; leaf blades 2-6 mm wide.....136. *C. louisianica*.

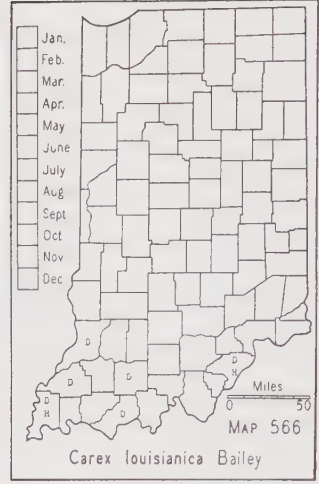
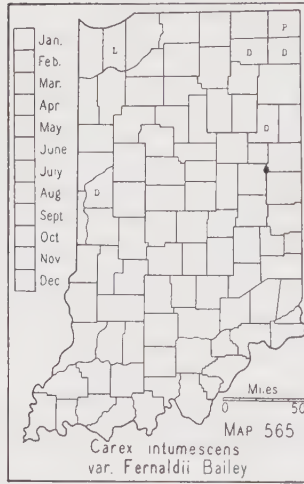
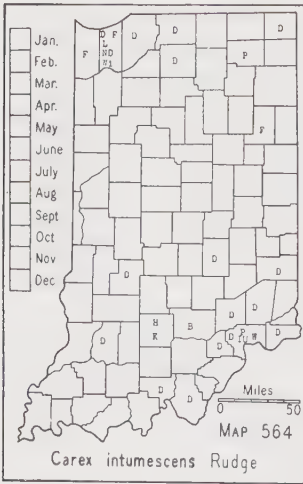
Culms cespitose; staminate spike 3-5 mm wide, sessile or short-peduncled; pistillate scales acuminate to rough-awned; leaf blades 4-15 mm wide.....137. *C. lupulina*.

Achenes not longer than wide, the angles prominently knobbed, the sides deeply concave; pistillate spikes cylindric or oblong-cylindric.

Perigynia ascending or slightly spreading, the beak less than twice the length of the body; achenes about as wide as long.....138. *C. lupuliformis*.

Perigynia widely spreading at maturity, the beak 2-3 times the length of the body; achenes much wider than long.....139. *C. gigantea*.

134. *Carex Grayii* Carey. (*Carex Grayii* var. *hispidula* Gray and



Carex Asa-Grayi Bailey.) Map 563. Common, but local, in low rich woods and on banks of creeks and borders of swamps. Widely distributed in the state but generally not found in abundance at any one locality. It is one of the most conspicuous of the sedges and so is apt to be collected more often than some of the inconspicuous species which may be actually more common.

The form known as var. *hispidula* shows no geographic segregation and doubtless does not merit even formal recognition. J. K. Underwood, of the University of Tennessee Agricultural Experiment Station, writes that he has observed the same plants which one year had hispidulous perigynia to be perfectly glabrous the next season.

Vt. to Wis., southw. to Ga., Tenn., and Mo.

135. *Carex intumescens* Rudge. Map 564. Frequent to locally common in depressions in low woods (maple, beech, sweet gum or pin oak) and in flat woods.

N. H. to Wis., southw. to Fla. and Tex.

135a. *Carex intumescens* var. *Fernaldii* Bailey. Map 565. Infrequent in northern Indiana, chiefly in the lake area, in habitats similar to those of the species.

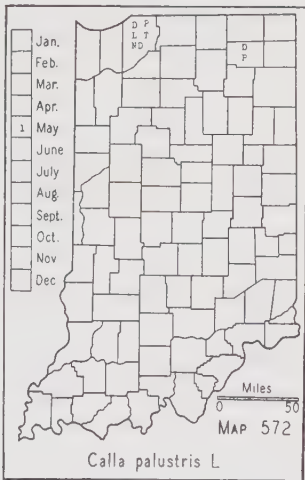
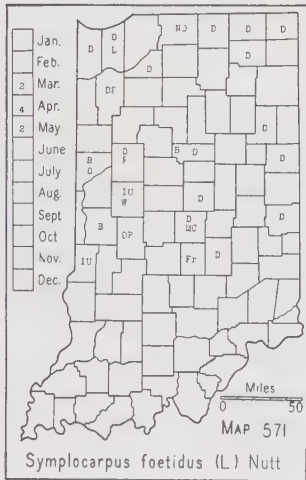
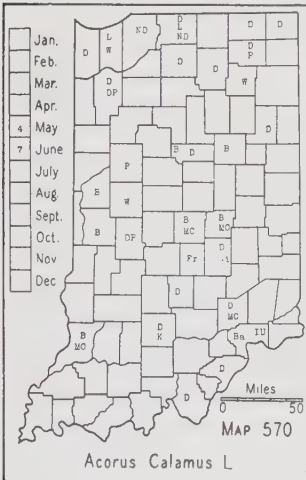
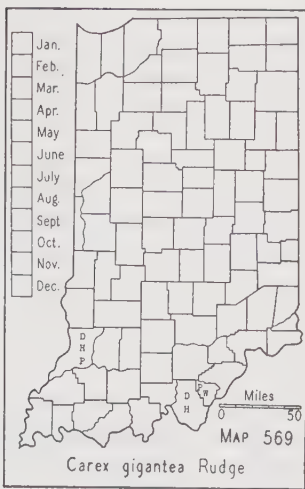
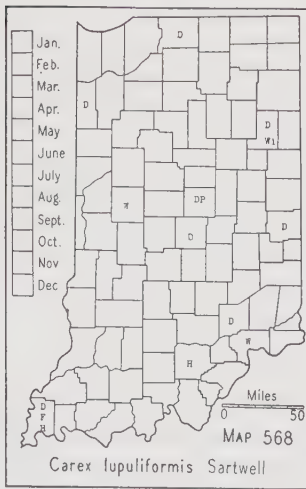
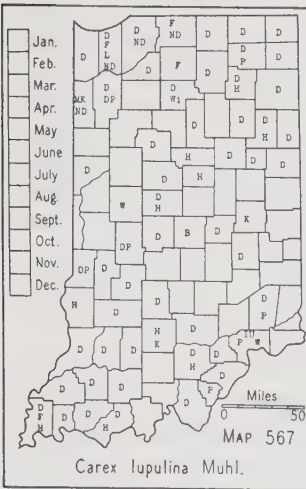
Newf. to Keewatin, southw. to Mass., N. Y., Ind., and Ill. and in the mts. to N. C.

136. *Carex louisianica* Bailey. (*Carex Halei* Carey.) Map 566. A southern species which reaches its northwestern limit in southern Indiana where it is infrequent in low open woods, flat woods, and cypress swamps, mostly in the unglaciated area.

N. J. to Ind., southw. to Fla. and Tex.

137. *Carex lupulina* Muhl. (*Carex lupulina* var. *pedunculata* Gray.) Map 567. Very common in swamps, ditches, and low open woods and on borders of ponds and rivers.

N. S. to Minn., southw. to Fla. and Tex.



138. *Carex lupuliformis* Sartwell. Map 568. Infrequent and local in swampy woods, wet ditches, and buttonbush swamps, and on borders of ponds.

Vt. to Minn., southw. to Va., La., and Tex.

139. *Carex gigantea* Rudge. Map 569. Rare and local in the southern counties in cypress swamps and swampy or low open woods.

Del. to Ky., Ind., and Mo., southw. to Fla. and Tex.

EXCLUDED SPECIES

1. *Carex radiata* (Wahl.) Dewey. Reported, as *Carex rosea* var. *radiata* Dewey, from Allen County, the Chicago region (including Lake and Porter Counties), and the Lower Wabash Valley but the reports were made before this species and *C. rosea* were clearly understood. The specimen upon which the Allen County record was based is *C. rosea* and doubtless the

specimens forming the bases of other reports should be referred to the same species.

Que. to Mich., southw. to N. C., and Tenn.

2. *Carex austrina* (Small) Mack. Deam reported this southern and western species from Benton County in 1928 on the basis of a collection (Deam no. 43219) which Mackenzie so determined. This collection is *C. grvida*. The specimen in the Deam Herbarium approaches var. *Lunelliana* in its rather broadly ovate, short-beaked perigynia. In his treatment of the Cariceae in North American Flora (18: 57. 1931.) Mackenzie does not cite *Carex austrina* from Indiana.

Mo. and Kans. to Ark. and Tex.

3. *Carex vulpinoidea* Michx. var. *pyncocéphala* Hermann. A collection by Deam (Steuben County, June 17, 1903) is referred to this variety in Rhodora 38: 363. 1936. Since this is the only specimen known from Indiana, however, and since it is not entirely typical it seems best to exclude it until additional and characteristic material may be found.

Mich. and Minn.; probably elsewhere on sandy shores of the Great Lakes.

4. *Carex canescens* L. There have been many reports of this northern species from Indiana but all specimens so labeled proved to be either var. *disjuncta* or var. *subloliacea* (except E. J. Hill's no. 60, which is *C. tenera*.) Without doubt typical *C. canescens* is not found in Indiana.

Lab. to B. C., locally southw. to Conn. and n. Mich.; also in Eurasia.

5. *Carex brunnescens* (Pers.) Poir. Both Pepon and Peattie have reported this sedge from Lake County but no specimens from there could be located in the Indiana herbaria, nor in the Field Museum, Chicago Academy of Sciences, Gray Herbarium, National Herbarium or the herbaria of the Universities of Illinois, Wisconsin, or Michigan. Since the species is known from Ohio and from at least as far southwest as Kalamazoo County, Michigan, it is not improbable that it does occasionally reach northern Indiana.

Greenland, Lab., and Newf. to Alaska, southw. to N. J. (in the mts. to N. C.), Colo., and Wash.; also in Eurasia.

6. *Carex exilis* Dewey. A species principally of the Coastal Plain, known in the Great Lakes region only from northern Michigan, Ontario, and Minnesota. Its occurrence in Steuben County, from which Bradner reported it, seems unlikely and it is excluded for want of a confirming specimen.

Lab. to Del.; locally inland in Vt., N. Y., Ont., Mich., and Minn.

7. *Carex stellulata* Gooden. This and *Carex Leersii* Willd. are now considered to be synonymous with *C. muricata* L. The numerous Indiana reports of *C. stellulata* and *C. Leersii* may have been based upon almost any species of § *Stellulatae*, probably chiefly upon *C. incompta* and *C. sterilis*.

8. *Carex muricata* L. A boreal species known from Greenland to Newfoundland, Quebec, Alaska, and northern Eurasia. It is hardly feasible to

attempt to make any disposition of MacDougal's report from Putnam County in Coulter's Catalogue. *Carex muricata* of most American authors of that period was *C. spicata* Hudson, a European species of §*Bracteosae* which has become established locally from Nova Scotia to Virginia and Ohio.

9. **Carex cephalantha** (Bailey) Bickn. This northern and eastern species was reported by Pepoon from Lake County as *C. stellulata* var. *cephalantha* (Bailey) Fern., but no specimen could be found. Its occurrence in Indiana is improbable.

Newf. to n. Mich. and Wis., southw. to Md., also on the Pacific coast in Wash. and Vancouver Island.

10. **Carex Merritt-Fernaldii** Mack. Peattie reports this species from Dune Park (Porter County) and the Calumet District (Lake County). The only specimen which could be found bearing this name, a collection by Umbach from Lake County in the University of Wisconsin Herbarium, is *C. brevior*. *C. Merritt-Fernaldii* has not been found in southern Michigan and it is not likely that its range extends as far south as Indiana.

Maine to Man., southw. to Mass. and n. N. Y.

11. **Carex hormathodes** Fern. Pepoon includes this species of the salt marshes of the Atlantic coast in his "Flora of the Chicago Region" with the statement "bogs, not common." Collections upon which this report was based could not be found but in all probability they should be referred to *C. Richii*. Deam no. 54013, from near a small creek in a field a fourth mile south of Archerville, Tippecanoe County, is more suggestive of this species than any other but the specimen is immature. No other Coastal Plain species are known from this area so that an occurrence of *C. hormathodes* here would seem to be almost certainly a chance introduction.

Along the coast, Newf. to Va., in or near salt marshes.

12. **Carex projécta** Mack. (*Carex tribuloides* var. *reducta* Bailey.) Reported from Hendricks and Marion Counties but the specimens upon which these reports were based are *C. tribuloides*.

Newf. to B. C., southw. to D. C. and Iowa.

13. **Carex foënea** Willd. (*Carex argyrantha* Tuckerm.) Reported from the Lower Wabash Valley and from Gibson and Marshall Counties. Specimens upon which Schneck's report from the Lower Wabash Valley was based were not found but they should undoubtedly be referred to some other species and the other reports also were probably based upon misidentifications.

Que. to Mich., southw. to Va. and Ohio.

14. **Carex defléxa** Hornem. A far northern species reported from Miller (Lake County) by Peattie with the statement "according to Gates." No specimen of his could be found, but in the University of Illinois Herbarium is a collection of *C. Emmonsii* which bore the label "*Carex deflexa* Hornem., sandy thicket, Miller, Ind. Agnes Chase no. 1791, May 30, 1902." The nearest known locality for *C. deflexa* is on the Keweenaw

Peninsula, Michigan, the extreme northern tip of the Upper Peninsula. The report of its occurrence in Indiana is not plausible.

Greenland to Alaska, southw. to Mass., n. Mich., and B. C.

15. *Carex pedunculàta* Muhl. Coulter says of this species, in his Catalogue, "Specimens I have examined leave no room for doubt as to its occurrence in our area," and he ascribes a record from Steuben County to Bradner and one from Noble County to Van Gorder. It is more than likely that the species occurs, or did occur, in these northern counties since it is known from Kalamazoo County, Michigan, and from Jo Daviess County, Illinois, but it must be excluded at present for lack of a confirming specimen. It should be looked for in rich beech or maple woods in the northern counties early in May as it matures early and the fruiting culms rapidly wither away.

Newf. to B. C., southw. to Va., Ill., and S. Dak.

16. *Carex livida* (Wahl.) Willd. Reported from Clark County by Baird & Taylor and from Lake County by Pepoon. No specimens could be found and doubtless specimens forming the basis of these reports should be referred to some other species.

Sphagnum bogs, Lab. and Man. to Alaska, southw. to Conn., N. J., Mich., Idaho, and n. Calif.; also in n. Europe.

17. *Carex saltuénsis* Bailey. (*Carex vaginata* of American authors.) A boreal species reported from Lake County by Higley & Raddin and by Peattie (who ascribe the record to Hill), and by Pepoon, but no collections bearing this name could be found. A species which reaches the southern limit of its known range so much farther north is not to be expected in Indiana.

Lab. to Yukon, southw. to n. New England, n. N. Y., n. Mich., n. Minn., and B. C.

18. *Carex ormostàchya* Wiegand. (Rhodora 24: 196-197. 1922.) Deam's report in 1928 for this species from Porter County was based upon a collection (Deam no. 44381) so named by Mackenzie. This collection should be referred to *C. laxiflora*, a determination confirmed (as *C. anceps* Muhl.) by Professor Wiegand in 1935.

Que. to Minn., southw. to Mass. and Pa.

19. *Carex réctor* Mack. (N. Amer. Flora 18: 261. 1935.) (*Carex granularis* var. *recta* Dewey.) This seems questionably distinct from *C. granularis*. Mackenzie (N. Amer. Flora 18: 262. 1935.) credits it to Indiana in addition to Alabama and Louisiana but the two Indiana collections referred by him to *C. rector* are immature. One (Deam no. 44317, Elkhart County) is so immature that it cannot be distinguished from *C. granularis* by means of his key or description; the other (Deam no. 41204, Jefferson County) is sufficiently mature to show the perigynia to be strongly ribbed and sessile, characters used by Mackenzie to distinguish *C. granularis* from *C. rector*.

20. *Carex formosa* Dewey. Reported from Putnam County by Grimes. The specimen upon which this report was based (Grimes no. 540, in DePauw University Herbarium) is *C. Davisii*. In Coulter's Catalogue also *C. formosa* is reported from Putnam County and the record ascribed to MacDougal. The collection which formed the basis of this report, too, should doubtless be referred to some other species.

Que. to Wis., southw. to Conn. and N. Y.; very local.

21. *Carex arctata* Boott. Bradner reported this species from Steuben County but no specimen could be found so it must be excluded. It is known in Ohio and in southwestern Michigan (Kalamazoo County; reported also from Berrien County) so that it is quite possible that it is, or was, native in dry rich woods in northern Indiana.

Newf. to Minn., southw. to Pa. and Ohio.

22. *Carex palléscens* L. Both Pepoon and Peattie report this species from Lake County, basing the reports on a record by Hill from Berry Lake. No specimens have been seen. Smith's report from Marion County and Schneck's from the Lower Wabash Valley unquestionably must have been based upon misidentifications, and the occurrence of the species even in northernmost Indiana is very doubtful.

Newf. to Wis., southw. to N. J., Pa., and Ill.; also in Eurasia.

23. *Carex scabrata* Schwein. Reported from Lake County by Higley & Raddin and by Peattie but no Indiana specimens could be found.

N. S. to Ont. and Mich., southw. mostly in the mts. to S. C. and Tenn.

24. *Carex paupérula* Michx. A northern species reported from Pine, Lake County, by Peattie and by Pepoon (as *C. paupercula* var. *irrigua* (Wahl.) Fern.) who ascribe the record to Hill. In all probability collections upon which these reports were based, but which could not be found, should be referred to *C. limosa*.

Newf. to Alaska, southw. to Pa., Minn., Colo., and Utah; also in n. Eurasia.

25. *Carex aquátilis* Wahl. A far northern and western species which has been reported from Lake, Porter, La Porte, and Marion Counties. All material forming the basis of Indiana reports should be referred to other species. *C. aquatilis* of most manuals for this area is *C. substricta* (Kükenth.) Mack.

Greenland to Alaska, southw. to Que. and in the w. mts. to N. Mex. and Calif.; also in n. Eurasia.

26. *Carex nebraskénsis* Dewey. This western sedge has been reported from Fayette, Jefferson, and Tippecanoe Counties by H. S. Jackson, apparently through the misapplication of a synonym. He lists it as the host of a rust and cites for it a correct synonym, *Carex Jamesii* Torr. But Prof. Arthur states that the rust occurs on *Carex Jamesii* Schwein., and without doubt that is the species that Jackson had.

S. Dak. and Kans. to N. Mex., Calif., and B. C.

27. *Carex crinita* Lam. var. *gynandra* (Schwein.) Schwein. & Torr. Reported, as *Carex gynandra* Schwein., by Clark from Lake Maxinkuckee, Marshall County. Clark's specimen upon which this report was based was found in the National Herbarium and it is typical *C. crinita*.

Newf. to Wis., southw. to Fla. and La.

28. *Carex pauciflora* Lightf. Pepon reports this species from the Chicago region as common in bogs "southeast" (i.e. Lake or Porter Counties, Ind.), and Peattie reports it from the Calumet District (Lake County). No Indiana specimens could be found except a sheet in the herbarium of Notre Dame University bearing the label "By Mineral Springs (Porter County), Ind., J. A. Nieuwland, 1918." Since Dr. Nieuwland usually gave the exact collection date for his specimens instead of merely the year, as well as a collection number, it seems possible that this label may have been made out from memory, rather than from field notes, at a date long after the actual collection. If this were so there could be some question whether he was really certain that the specimen had been collected in Indiana. The present evidence for the occurrence of the species in the state is hardly sufficiently conclusive to admit it as a member of the Indiana flora.

Sphagnum bogs; Newf. to Alaska, southw. to Conn., Pa., and Minn., and near the Pacific coast to Wash.; also in n. Eurasia.

29. *Carex Baileyi* Britt. (*Carex lurida* var. *gracilis* (Boott) Bailey.) Reported from Clark, Marion, and Putnam Counties. Specimens were not found but doubtless all Indiana reports were based upon incorrect determinations.

N. H. to N. Y., southw. in the mts. to Va. and Tenn.

30. *Carex comosa* × *hystericina* var. *Dudleyi*. A hybrid reported from Lake County by Higley & Raddin and by Peattie. No specimens could be found.

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